

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
Yuest, Daniel T.)	Atty Docket: 30130-RA
)	
Serial No.: 10/644,138)	Examiner: Figueroa, Felix O.
)	
Filed: August 20, 2003)	Group Art: 2833
)	
For: POWER CORD PLUG)	Technology Center 2800
SECURING DEVICE)	

November 27, 2006

APPLICANT'S APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Pursuant to the Notice of Appeal filed September 27, 2006, Applicant hereby appeals to the Board of Patent Appeals and Interferences from the decision of the Examiner, made final, having a mailing date of March 31, 2006 rejecting claims 1-23 in the above-referenced application.

Please find enclosed the requisite fees, taking into account Applicant's claim of "small entity" status.

CERTIFICATE OF ELECTRONIC FILING

I hereby certify that this correspondence is being electronically filed with the United States Patent and Trademark Office Private PAIR/EFS addressed to the Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450:

Barry E. Kaplan
(Name of Person Mailing)

/Barry E. Kaplan/
(Signature of Person Mailing)

November 27, 2006
(Date)

I. REAL PARTY IN INTEREST

The real party in interest is Daniel T. Yoest, an individual residing at 1525 Mt. McKinley Drive, Grayson, GA 30017, sole inventor and undivided owner of the above-referenced application.

II. RELATED APPEALS AND INTERFERENCES

Applicant is not aware of any related appeals or interferences which may have a bearing on a decision in the instant appeal.

III. STATUS OF CLAIMS

Claims 1-23 are pending in the application. Each of claims 1-23 stands rejected as detailed in the final Office Action, mailed March 31, 2006. Applicant hereby appeals the final rejection of each of claims 1-23.

IV. STATUS OF AMENDMENTS

No amendments have been made subsequent to the final rejection of claims 1-23 in the final Office Action.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention, as recited in independent claims 1, 10, and 18, is a power cord plug securing device and a method of use thereof. More specifically, and with reference to Figures 1 and 2 of the application and to pages 14-16 of the written description, the power cord securing device 10 includes clasp block member 40 and securing strap 20 extending from clasp block member 40. Clasp block member 40 is substantially U-shaped and includes trough region 42 with retaining walls 44 and 46, including an open region disposed between the retaining walls for engaging and retaining power

cord PC. Strap 20 includes throughhole 26 adapted to receive outlet cover plate screw S for securing power cord securing device 10 to outlet cover plate CP.

With reference to Figures 3-6 and pages 17-19 of the written description, power cord securing strap 10 includes clasp block member 40 (as described above) and clasp block member 140 (analogous to clasp block member 40) attached to respective ends 22 and 24 of strap 20 for engaging and retaining respective power cords PC1 and PC2 for sustaining female plug head FPH in electrical engagement with male plug head MPH.

Power cord securing strap 10 is used to maintain electrical contact between a first current carrying member and a second current carrying member (page 19, lines 15-23) by securing the first current carrying member within a clasp block member (for example as described at page 16, lines 8-11) and by securing the first current carrying member to the second current carrying member via a means for securing carried by a securing strap (the means being additional clasp block 120 and throughhole 24; additional clasp block member 140 replaces throughhole 26, page 17, lines 12-14 and as made clear by dependent claims 20 and 21, to secure the first current carrying member to a power cord or an outlet).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following grounds of rejection are presented for review:

1. Claims 1-4, 6, 8, 9, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graves (US 4,484,185) in view of Tuttle (US 3,888,439) and Grosswendt (US 5,573,420);
2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Graves, Tuttle, and Grosswendt, and further in view of Cross (5,211,573);

3. Claims 10-16 and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook (US 6,033,251) in view of Grosswendt; and
4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cook and Grosswendt and further in view of Cross (US 5,211,573).

The Graves, Tuttle, Grosswendt, Laherty, Cook, and Cross patents are attached hereto for reference as Exhibits A-F in the Evidence Appendix.

VII. ARGUMENT

Ground 1, rejection of claims 1-4, 6, 8, 9, 18, and 19

Claim 1

When making a rejection under 35 U.S.C. 103(a), “the examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness.” MPEP 2142. “To establish a *prima facie* case of obviousness. . . the prior art reference (or references when combined) must teach or suggest all the claim limitations.” MPEP 2142.

As to claim 1, the Examiner stated, at page 2 of the final Office Action, that “Graves discloses a power cord plug securing device, comprising: a clasp member (at end 52) for removably and securably retaining a power cord therein; the clasp member comprising a trough region (between 54, 56) with retaining walls (54, 56) extending therefrom; the trough region disposed along a first axis of orientation; a securing strap (48) proximate from a base region underlying the trough region and disposed along an axis of orientation parallel to the first axis of orientation; the securing strap oriented for underlying the power cord plug when in use.” The Examiner conceded, at page 2 of the final Office Action, that Graves fails to disclose “the hole to receive a screw.” The Examiner then stated, at page 2 of the final

Office Action, that "Tuttle teaches a through-hole (30) formed through securing strap (12), the through-hole adapted to receive a screw for removable attachment of the device to a respective supporting part to allow connection to different mating parts."

At page 3, the Examiner further stated that, "Graves, as modified, discloses substantially the claimed invention," but further conceded that Graves and Tuttle fail to teach, "the clasp member being block-shaped, and the through [sic] region." The Examiner stated that, "Grosswendt teaches the use of an essentially inflexible clasp block member (10/20) with a through [sic] region comprising a truncated cylindrical bottom portion and approximated [sic] vertically disposed retaining walls, the clasp block member further comprising an open region disposed approximately opposite the cylindrical bottom portion and centrally between the retaining walls, the open region forming an elongated channel, and a securing strap (26) underlying the clasp block member."

Applicant respectfully submits, however, that device 10, comprising first connector 20, of Grosswendt fails to teach an essentially inflexible clasp block member with a trough region comprising a truncated cylindrical bottom portion and approximately vertically disposed retaining walls, the clasp block member further comprising an open region disposed approximately opposite the cylindrical bottom portion and centrally between the retaining walls, the open region forming an elongated channel as asserted by the Examiner. Specifically, Grosswendt fails to teach an essentially inflexible clasp because, as is made clear at col. 4, lines 17-27 and again at col. 5, lines 23-27 of Grosswendt, connector 20 is not essentially inflexible, but is instead flexible and may be bent apart, thereby allowing a cord to pass through teeth 54 and 56 into central opening 38. See, also, Figs. 1 and 7.

Grosswendt further fails to teach an open region disposed approximately opposite a truncated cylindrical bottom portion of a trough forming an elongate channel, as required by claim 1. Specifically, the plain meaning of the word "trough" describes a channel structure with an open side. Grosswendt, however, discloses a central opening 38 completely surrounded by connector 20, lacking an open side, since teeth 54 and 56 connect sides 50 and 52. See Fig. 7. Furthermore, what is implicitly required by the claim element "trough" is explicitly required by the recitation that the trough region comprises a truncated cylindrical bottom portion (i.e. a cylinder with a portion of the side wall missing or cut off) and an open region disposed approximately opposite the cylindrical bottom portion (i.e. the portion where the side wall of the cylinder is missing). Grosswendt, on the other hand, fails to teach the open portion required by the plain meaning of the word "trough," and explicitly required by the recitation of the open portion opposite the truncated cylindrical bottom portion because teeth 54 and 56 close the top portion of connector 20.

For further clarification, the difference between what is required by claim 1 and what is taught by Grosswendt is illustrated by a comparison of Fig. 7 of Grosswendt and Fig. 1 of the application. As shown in Fig. 7 of Grosswendt, teeth 54 and 56 of connector 20 must be flexed apart in order to allow a cord to enter central opening 38. As shown in Figure 1 of the application, however, a cord may enter trough region 42 through the open region between retaining walls 44 and 46 without flexing of the retaining walls.

In addition, Applicant respectfully submits that Tuttle fails to teach, "a throughhole formed through said securing strap, said throughhole adapted to receive an electrical outlet cover plate screw for removable attachment of said device to an electrical outlet cover plate, thereby maintaining electrical engagement of electrical conductors of a plug head of the power

cord with an electrical outlet,” as required by the claims. Tuttle, instead, teaches a hanger system for exhaust system components of automotive vehicles. See Abstract. As such, “apertures 30 through which may be inserted bolts 32 to secure the strap to a suitable support 34,” (Tuttle; col. 2, lines 21-23) fails to teach a structure adapted to receive an electrical outlet cover plate screw, and further fails to teach that a plug may be maintained in electrical contact with an electrical outlet by screwing the strap to the outlet cover plate. Instead, Tuttle teaches that an automotive exhaust may be supported by bolting the strap (which is stamped metal; see col. 2, lines 57-61) to a vehicle to support an exhaust system. Thus, not only is Tuttle non-analogous art, to which one of ordinary skill in the art would not have looked when attempting to maintain electrical contact between an outlet and a plug, but Tuttle does not disclose the required claim elements.

Thus, for the reasons stated above, claim 1 is patentable over Graves in view of Tuttle and Grosswendt. Claims 2-9, depending from claim 1, are allowable as well, at least for the reasons stated with respect to claim 1.

Claim 3

As to claim 3, the Examiner stated, at page 3, that, “Grosswendt discloses the clasp member being substantially U-shaped (when connected to the power cord).” Such U-shape, as required by claim 3, goes to further clarify that power cord PC may be removed from trough region 42 without movement of retaining walls 44 and 46. Grosswendt, however, fails to teach a U-shaped clasp block member since teeth 54 and 56 must be separated sufficiently by manual force perpendicular to the reference plane during insertion and

removal of the cord into and out of the central opening 38. See Grosswendt; col. 5, lines 23-31.

Thus, Grosswendt fails to teach a U-shaped clasp block member. Claim 3 is, therefore, patentable over Graves in view of Tuttle and Grosswendt, at least because the Examiner has failed to establish where the U-shaped clasp block member is taught in the prior art.

Claim 18

As to claim 18, to the extent that claim 18 requires the step of obtaining a device having the elements of the device of claim 1, the arguments made above as to the essentially inflexible clasp block member, the trough region, the approximately vertically disposed retaining walls, and the open portion apply to the rejection of claim 18, and are incorporated by reference here.

Thus, for the reasons stated above, i.e. because the Examiner has failed to establish where all the elements are taught in the prior art, claim 18 is patentable over Graves in view of Tuttle and Grosswendt. Claims 19-23, depending from claim 18, are allowable as well, at least for the reasons stated with respect to claim 18.

Ground 2, rejection of claim 5

Claim 5

As to claim 5, the Examiner stated, at page 4, that, "Graves, as modified, discloses substantially the claimed invention," but conceded that Graves, as modified, fails to teach "ribbed or textured walls." The Examiner further stated that, "Cross teaches the use of

ribbed or textured walls (80) to provide a friction fit (col. 4, lines 53-55).” Applicant respectfully submits that Cross fails to disclose a trough region or retaining walls as required by claims 1, 2 and 4, wherein at least one of the trough region and the retaining walls are at least partially textured or ribbed for increased frictional association with the power cord. Shoulders 80 and 88 act as teeth for retention means 78 and 86, which retention means retain a cord by acting as jaws which bite down on the cord when tension is placed on the cord in one direction to remove it from retention means 78 or 86. See Fig. 2 and col. 5, lines 16-27, 40-53, and 61-68. Shoulders 80 and 88 would have no effect on the cord when the tension is placed on the cord in an opposite direction (towards the other end of the device 60) or in a transverse direction (toward the open side of the device) due to the angled arrangement of retention means 78 and 86. See Figs. 1-4, and col. 4, line 64 to col. 5, line 2, explaining that the device prevents only pulling apart of the plugs). Thus, retention means 78 and 86 work by the flexibility of the rib-like retention means, and, as such, Cross fails to teach essentially inflexible surfaces that are textured or ribbed for increased frictional association with a power cord retained therein, and instead teaches teeth disposed on the ends of pinching-type cord retention means.

Furthermore, as Cross fails to remedy the deficiencies of Graves, Tuttle, and Grosswendt, as discussed above with respect to claim 1, claim 5 is patentable over Graves in view of Tuttle, Grosswendt, and Cross.

Ground 3, rejection of claims 10-16 and 18-23

Claim 10

As to claim 10, the Examiner stated, at page 5, that, "Cook discloses a power cord plug securing device (Fig. 1), comprising; a first clasp member (left side) for removably and securably retaining a first power cord (26) therein; a second clasp member (right side) for removably and securably retaining a second power cord therein; and a securing strap (34) extending proximate between a base region underlying the trough region of the first clasp member and a base region underlying the trough region of the second clasp member." The Examiner then conceded, at page 5, that Cook fails to teach, "the clasp member being block shaped; and the specific through [sic] region." The Examiner then stated that, "Grosswendt teaches the use of an essentially inflexible clasp block member (10/20) with a through [sic] region, the trough region disposed along a first axis of orientation corresponding with an axis of the power cord and comprising a truncated cylindrical bottom portion and approximately vertically disposed retaining walls, the clasp block member further comprising an open region disposed approximated [sic] opposite the cylindrical bottom portion and centrally between the retaining walls, the open region forming an elongated channel, and a securing strap (26) underlying the clasp block member, disposed along an axis of orientation parallel to the first axis of orientations [sic] and underlying the power cord plug."

Applicant respectfully submits that, as stated above, and at least for the reasons stated above, that Grosswendt fails to teach an essentially inflexible clasp block member, as required by claim 10 (because connector 20 of Grosswendt is flexible). See Grosswendt; col. 4, lines 14-27 and col. 5, lines 23-31. Applicant further respectfully submits that, as stated above, and at least for the reasons stated above, that Grosswendt further fails to teach the trough region, truncated cylindrical bottom portion, opposing open portion, and elongated channel, as required by claim 10, because teeth 54 and 56 of connector 20 of Grosswendt

form a closed portion completely enclosing central opening 38. See Grosswendt; Figs. 2 and 5-7.

Thus, the Examiner has failed to establish a *prima facie* case of obviousness because the Examiner has failed to establish where all limitations are taught or suggested in the prior art.

Claim 15

As to claim 15, the Examiner stated, at page 6, that, "Grosswendt discloses the first and second clasp members being substantially U-shaped." Such U-shape, as required by claim 15, goes to further clarify that power cord PC may be removed from trough region 42 without movement of retaining walls 44 and 46. Grosswendt, however, fails to teach a U-shaped clasp block member since teeth 54 and 56 must be separated sufficiently by manual force perpendicular to the reference plane during insertion and removal of the cord into and out of the central opening 38. See Grosswendt; col. 5, lines 23-31.

Thus, Grosswendt fails to teach a U-shaped clasp block member. Claim 15 is, therefore, patentable over Cook in view of Grosswendt, at least because the Examiner has failed to establish where the U-shaped clasp block member is taught in the prior art.

Claim 18

As to claim 18, to the extent that claim 18 requires the step of obtaining a device having the element of the device of claim 10, the arguments made above as to the essentially inflexible clasp block member, the trough region, the approximately vertically disposed retaining walls, and the open portion apply to the rejection of claim 18, and are incorporated by reference here.

Thus, for the reasons stated above, claim 18 is patentable over Cook in view of Grosswendt. Claims 19-23, depending from claim 18, are allowable as well, at least for the reasons stated with respect to claim 18.

Ground 4, rejection of claim 17

Claim 17

As to claim 17, the Examiner stated, at page 7, that, "Cook, as modified, discloses substantially the claimed invention," but conceded that Cook fails to teach "ribbed or textured walls." The Examiner then stated that, "Cross teaches the use of ribbed or textured walls (80) to provide a friction fit (col. 4, lines 53-55)." Applicant respectfully submits that Cross fails to disclose a trough region or retaining walls as required by claims 1, 2 and 4, wherein at least one of the trough region and the retaining walls are at least partially textured or ribbed for increased frictional association with the power cord. Instead, shoulders 80 and 88 act as teeth for retention means 78 and 86, which retention means retain a cord by acting as jaws which bite down on the cord when tension is placed on the cord in one direction to remove it from retention means 78 or 86. See Fig. 2 and col. 5, lines 16-27, 40-53, and 61-68. Shoulders 80 and 88 have no effect on the cord when the tension is placed on the cord in an opposite direction (towards the other end of the device 60) or in a transverse direction (toward the open side of the device), due to the angled arrangement of retention means 78 and 86. See Figs. 1-4, and col. 4, line 64 to col. 5, line 2, explaining that the device prevents only pulling apart of the plugs). Thus, retention means 78 and 86 work by the flexibility of the rib-like retention means, and, as such, Cross fails to teach essentially inflexible surfaces that are textured or ribbed for increased frictional association with a power cord retained

therein, and instead teaches teeth disposed on the ends of pinching-type cord retention means.

Furthermore, as Cross fails to remedy the deficiencies of Cross and Grosswendt, as discussed above with respect to claim 10, claim 17 is patentable over Cook in view of Grosswendt and Cross.

Conclusion

Applicant respectfully submits that the rejection of claims 1-23, made final in the Office Action dated March 31, 2006, should be reversed at least for the reasons stated above. Allowance of claims 1-23 is, therefore, respectfully requested.

Respectfully submitted this 27th day of November, 2006.

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VIII. CLAIMS APPENDIX

The following is a listing of the claims involved in the instant appeal.

1. A power cord plug securing device, comprising:

an essentially inflexible clasp block member for removably and securably retaining a power cord therein, said clasp block member comprising a trough region disposed approximately centrally therethrough, said trough region disposed along a first axis of orientation corresponding with an axis of the power cord;

said trough region comprising a truncated cylindrical bottom portion and approximately vertically disposed retaining walls thereabove, said clasp block member further comprising an open region disposed approximately opposite said cylindrical bottom portion and centrally between said retaining walls, said open region forming an elongated channel to allow the power cord to traverse into and be captured within said cylindrical bottom portion;

a securing strap extending proximate from a base region of said clasp block member underlying said trough region and disposed along an axis of orientation parallel to said first axis of orientation, said securing strap oriented for underlying the power cord plug when in use; and,

a throughhole formed through said securing strap, said throughhole adapted to receive an electrical outlet cover plate screw for removable attachment of said device to an electrical outlet cover plate, thereby maintaining electrical engagement of electrical conductors of a plug head of the power cord with an electrical outlet.

2. The device of Claim 1, wherein said clasp block member is adapted to removably engage and securely retain a portion of the power cord immediately aft of the plug head when attached thereto.
3. The device of Claim 2, wherein said clasp block member is substantially U-shaped.
4. The device of Claim 2, wherein said retaining walls terminate in inwardly projecting ends for securely maintaining the portion of the power cord immediately aft of the plug head within said trough region.
5. The device of Claim 4, wherein at least one of said trough region and said retaining walls are at least partially textured or ribbed for increased frictional association with the portion of the power cord retained therein.
6. The device of Claim 1, wherein a first end of said securing strap is integrally formed with said clasp member.
7. The device of Claim 6, wherein a second end of said securing strap is integrally formed with the electrical outlet cover plate.
8. The device of Claim 1, wherein said throughhole is opposingly positioned from said clasp member on said securing strap.

9. The device of Claim 1, further comprising a plurality of throughholes formed through said securing strap for purposes of selectively determining site of engagement of the screw therewith, and, thus, the site of engagement of said clasp member on the power cord.

10. A power cord plug securing device, comprising:

a first essentially inflexible clasp block member for removably and securably retaining a first power cord therein, said first clasp block member comprising a trough region disposed approximately centrally therethrough, said trough region disposed along a first axis of orientation corresponding with an axis of the first power cord;

a second essentially inflexible clasp block member for removably and securably retaining a second power cord therein, said second clasp block member comprising a trough region disposed approximately centrally therethrough, said trough region of said second clasp block member disposed along an axis of orientation parallel to said first axis of orientation;

each of said trough regions comprising a truncated cylindrical bottom portion and approximately vertically disposed retaining walls thereabove, each of said clasp block members further comprising an open region disposed approximately opposite said cylindrical bottom portion and centrally between said retaining walls, , said open region forming an elongated channel to allow a power cord to traverse into and be captured within said cylindrical bottom portion; and,

a securing strap extending between a base region underlying said trough region of said first clasp block member and a base region underlying said trough

region of said second clasp block member, wherein said securing strap is disposed along an axis of orientation parallel to said first axis of orientation, said securing strap oriented for underlying the power cord plugs when in use.

11. The device of Claim 10, wherein said plug securing device is adapted to maintain the first power cord in electrical engagement with the second power cord.

12. The device of Claim 10, further comprising a throughhole formed through said securing strap, said throughhole adapted to receive an electrical outlet cover plate screw for removable attachment of said device to an electrical outlet cover plate.

13. The device of Claim 12, wherein at least one of said first and second clasp members is adapted to maintain electrical engagement of a plug head of at least one of the first and second power cords with an electrical outlet.

14. The device of Claim 10, wherein said first clasp member is adapted to removably engage and securely retain a portion of the first power cord immediately aft of a plug head attached thereto, and wherein said second clasp member is adapted to removably engage and securely retain a portion of the second power cord immediately aft of a plug head attached thereto.

15. The device of Claim 14, wherein said first and second clasp members are substantially U-shaped.

16. The device of Claim 14, wherein said retaining walls terminate in inwardly projecting ends for securely maintaining the portions of the respective first and second power cords immediately aft of the plug heads within each said trough region.

17. The device of Claim 16, wherein at least one of said trough regions and said retaining walls are at least partially textured or ribbed for increased frictional association with the portions of the respective first and second power cords retained therein.

18. A method of maintaining electrical continuity between at least a first and second current carrying member, said method comprising the steps of:

- a. obtaining a device having an essentially inflexible clasp block member for removably and securably retaining the first current carrying member therein, said clasp block member comprising a trough region disposed approximately centrally therethrough, said trough region disposed along a first axis of orientation corresponding with an axis of the first current carrying member, said trough region comprising a truncated cylindrical bottom portion and approximately vertically disposed retaining walls thereabove, said clasp block member further comprising an open region disposed approximately opposite said cylindrical bottom portion and centrally between said retaining walls, said open region forming an elongated channel to allow a current carrying member to traverse into and be captured within said cylindrical bottom portion, wherein said clasp block member comprises a securing strap extending proximate from a base region of said clasp block member underlying

said trough region and disposed along an axis of orientation parallel to said first axis of orientation, said securing strap oriented for underlying a plug of the current carrying member when in use;

b. securing within said clasp block member a portion of the first current carrying member; and,

c. securing the first current carrying member to the second current carrying member via a means for securing carried by said securing strap.

19. The method of Claim 18, wherein the first current carrying member is a first cord-type current carrying member, and wherein the second current carrying member is selected from the group consisting of a second cord-type current carrying member, and an electrical outlet.

20. The method of Claim 19, wherein said securing means is a throughhole formed through said securing strap, said throughhole adapted to receive an electrical outlet cover plate screw for removable attachment of said device to an electrical outlet cover plate for maintaining the first cord-type current carrying member in electrical continuity with the electrical outlet.

21. The method of Claim 19, wherein said securing means is a second clasp member carried by said securing strap, said second clasp member adapted to removably and securably engage a portion of the second cord-type current carrying member.

22. The method of Claim 21, wherein said device is adapted to maintain electrical engagement between the first cord-type current carrying member and the second cord-type current carrying member.

23. The method of Claim 18, wherein said securing strap further comprises a throughhole formed therethrough, said throughhole adapted to receive an electrical outlet cover plate screw for removable attachment of said device to an electrical outlet cover plate for maintaining a first cord-type current carrying member and a second cord-type current carrying member in electrical continuity with an electrical outlet.

IX. EVIDENCE APPENDIX

EXHIBIT A

United States Patent Number 4,484,185 to Graves. This reference was originally entered in the record by the Examiner in a list of references cited by the Examiner (PTO-892 form) on November 29, 2004, accompanying a final Office Action.

United States Patent [19]
Graves

[11] **Patent Number:** **4,484,185**
[45] **Date of Patent:** **Nov. 20, 1984**

[54] **SAFETY PLUG ADAPTER**

[76] **Inventor:** James D. Graves, 511 W. Stephen St.,
Martinsburg, W. Va. 25401

[21] **Appl. No.:** 522,764

[22] **Filed:** Aug. 12, 1983

[51] **Int. Cl.:** G08B 21/00; H01R 13/62

[52] **U.S. Cl.:** 340/656; 174/66;
337/1; 337/242; 339/36; 339/75 P

[58] **Field of Search:** 340/656; 339/75 R, 75 M,
339/75 MP, 75 P, 76, 77, 78, 79, 82, 84, 103 R,
104, 105, 36; 174/66, 67; 337/1, 3, 4, 5, 72, 197,
198, 79, 241, 242, 265, 266, 332, 376

[56] **References Cited**

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2,913,791	11/1959	Martin	339/104 X
3,258,564	6/1966	Conigliaro	337/72
3,530,337	9/1970	Moore	340/656 X

3,833,875	9/1974	Holoka	337/198 X
3,924,914	12/1975	Banner	340/656 X
4,089,032	5/1978	Deil Orfano	340/656 X
4,349,238	9/1982	Showman et al.	339/75 M

Primary Examiner—James L. Rowland

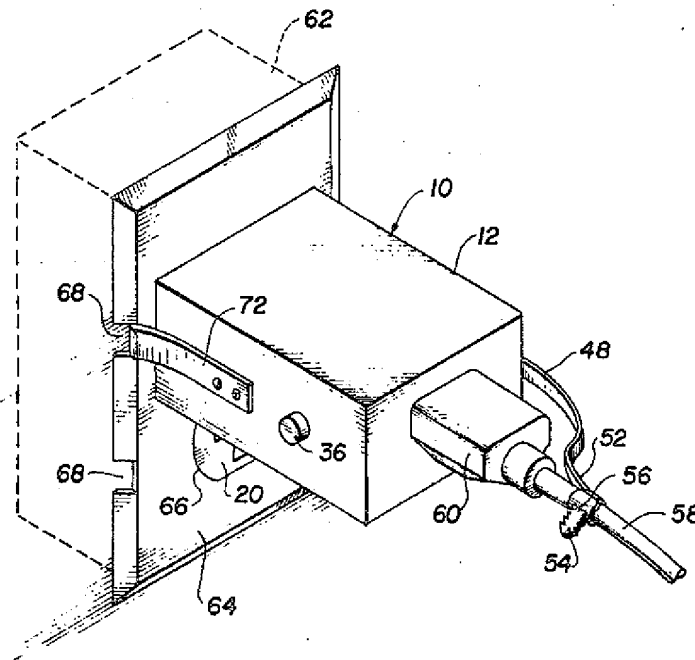
Assistant Examiner—Daniel Myer

Attorney, Agent, or Firm—Edwin E. Greigg

[57] **ABSTRACT**

A safety plug to an outlet box receptacle, which includes an overcurrent protection device, and engaging devices for engaging the safety plug adapter both to flanged portions of the outlet box face plate and to the electric cord so that it is difficult for a small child to remove the electric cord connecting plug from the adapter, or the adapter from the outlet box receptacle. The adapter may also include a voltage-actuated light-emitting device to indicate when the outlet box receptacle is energized, and a spring-loaded adapter receptacle cover plate.

11 Claims, 10 Drawing Figures



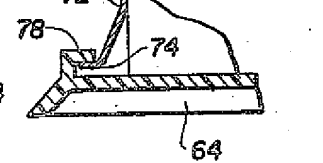
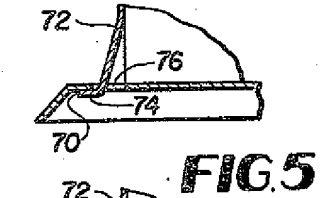
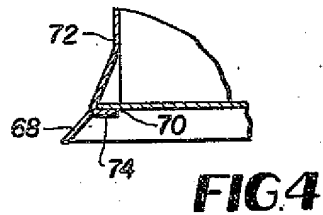
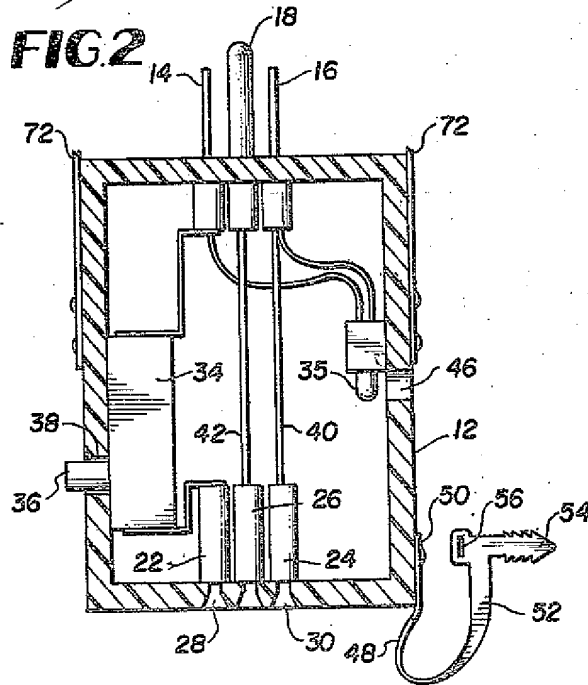
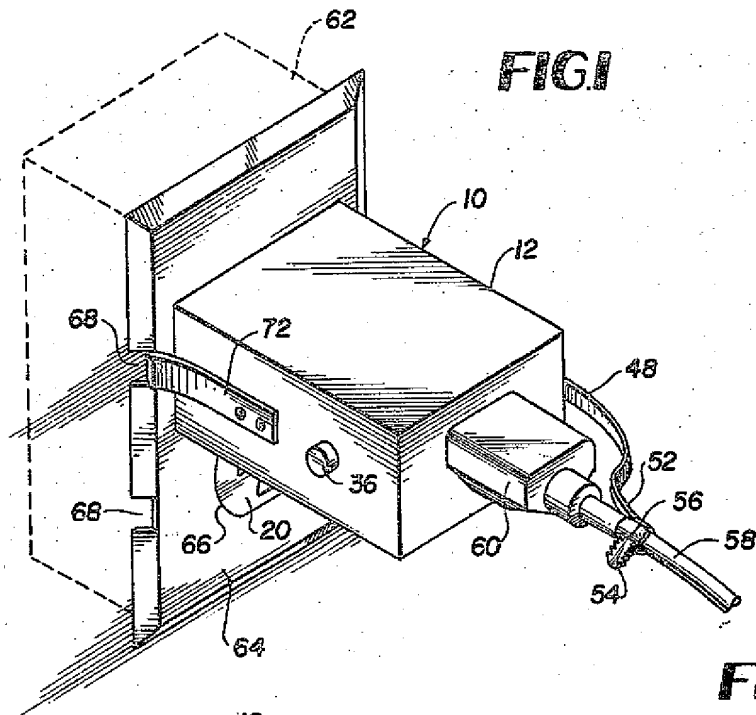


FIG. 6

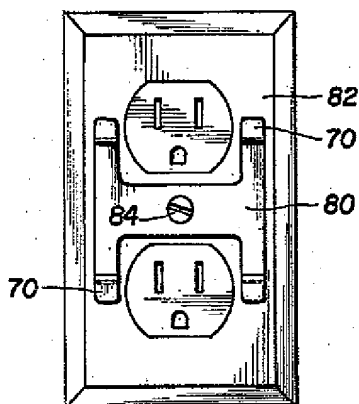


FIG. 7

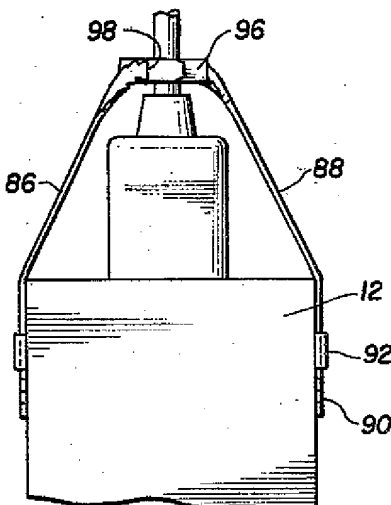


FIG. 8

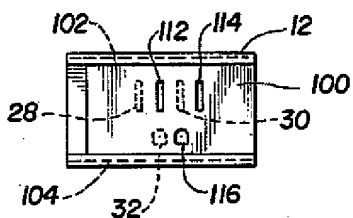


FIG. 9

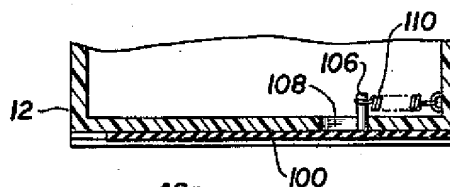
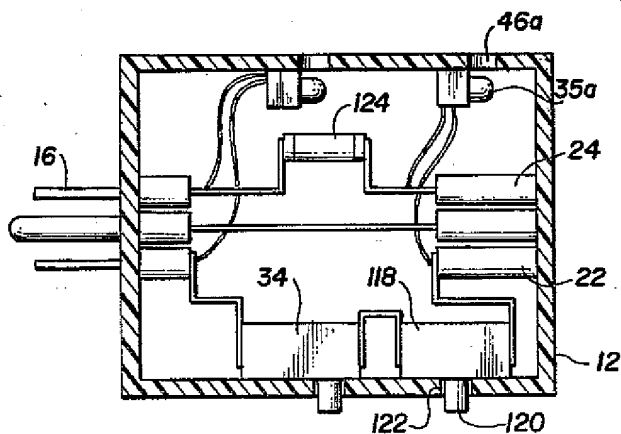


FIG. 10



SAFETY PLUG ADAPTER

BACKGROUND OF THE INVENTION

The invention relates generally to a safety plug adapter, which includes an overcurrent protection device, connected between a single phase, grounded, polarized electrical receptacle and a two or three prong electric plug for supplying electric power to an electrical appliance or device. More particularly, the invention relates to this type of safety plug adapter which includes safety features for protecting small children against contact with an energized electrical circuit.

Known safety plug adapters, such as those described in U.S. Pat. No. 3,368,110, issued Feb. 6, 1968 to R. A. Taylor, or in U.S. Pat. No. 2,649,522, issued Aug. 18, 1953 to M. J. Marcus, include fuses which will limit the magnitude and duration of overload or short circuit current. Thus, if a small child inserted a wire into the apertures of one of these known safety adapters which was plugged into a conventional wall receptacle to thus cause a short circuit current to flow through the wire, these fuses would provide some degree of protection to the child from burning caused by the heating and/or melting of this wire. However, the child could still be seriously injured. Also, there is nothing to prevent a small child from disconnecting one of these known safety plug adapters from the wall receptacle, and thereafter inserting a wire in the openings of the wall receptacle, in which case, a child could be seriously burnt by molten metal or subjected to severe electrical shock before a fuse or circuit breaker in the electrical supply line for the wall receptacle operates to disconnect this wall receptacle.

There are known plastic plugs of insulating material, which, when inserted in an electrical receptacle, are difficult for small children to remove. In households containing small children, these known insulating plugs can be used to cover unused electrical receptacles to protect such small children from contact with an energized conductor of the unused receptacle. However, there is also a need to better protect small children from contact with an energized electrical conductor of a receptacle which is normally used, since it is relatively easy for a small child to disconnect an electrical appliance, or device, such as a lamp, by merely tugging or jerking on the electric cord for this appliance.

OBJECTS AND SUMMARY OF THE INVENTION

Therefore it is a primary object of the invention to provide a safety plug adapter including an overcurrent protection device, which can be easily removed from an electrical receptacle into which this safety plug adapter is engaged by an adult person, but which is very difficult for a small child to disconnect from the receptacle.

It is a further object of the invention to provide a safety plug adapter which is difficult for a small child to disconnect from the connecting cord plug of an electrical device engaged with the safety plug adapter.

It is another object of the invention to provide a safety plug adapter having a voltage-actuated light-emitting device for indicating whether an electrical receptacle engaged by the safety plug adapter is energized.

It is a still further object of the invention to provide a safety plug adapter having a spring-loaded receptacle cover plate for covering the receptacle of the safety

plug adapter whenever the line plug of an electrical appliance or device is not engaged with this receptacle.

In a preferred embodiment of this invention, three contact prongs extend outwardly from one end of an adapter housing for engaging a single phase, grounded, polarized, electric receptacle mounted in an electrical outlet box. The safety plug adapter includes a similar receptacle for receiving a single phase, 3 prong, polarized electric plug at an opposite end of the adapter housing. The three contact members of the adapter receptacle are electrically connected by three connecting lines to the three corresponding contact prongs extending from the one end of the housing. The connecting line to be connected to the energized line of the power supply circuit includes an overcurrent protection device, such as a circuit breaker or fuse which is disposed within the adapter housing. A voltage actuated light-emitting device, such as a light-emitting diode, is disposed within an opening on one side of the adapter housing and is electrically connected between the energized line contact prong and the system ground contact prong, so that when these prongs are housing and has an opposite end which is adapted for connection to the electrical cord of an electrical appliance or device. Thus, one of these safety plug adapters, having the correctly sized overcurrent protection device for a particular electrical apparatus, can be permanently connected to this electrical apparatus.

A face plate, which is mounted to the outlet box, includes an access opening for the electrical receptacle mounted within the outlet box, and has openings or L-shaped extensions disposed on opposite sides of the access opening to define two flanged portions for engaging members affixed to opposite sides of the adapter housing. For example, these engaging members may be spring steel strips, each having one end fixed to the adapter housing and an opposite free end which is bent to engage the flanged portions of the outlet face plate. These steel spring strips are disposed so that they must be either pushed inwardly or pulled outwardly when the adapter is inserted into the outlet box receptacle in order to move past the two flanged portions of the outlet face plate. After the adapter has been fully inserted in the outlet box receptacle, the spring steel strips are released to allow the bent ends of these strips to engage the flanged portions of the face plate and prevent the adapter from being disconnected from the outlet box receptacle without again exerting inward or outward pressure on these two spring steel strips.

The receptacle end of the adapter housing may also carry a moveable receptacle cover plate which is spring-loaded to cover the adapter receptacle whenever this receptacle is not engaged with the electrical cord plug of an electrical device.

The invention will be better understood, as well as further objects and advantages will become more apparent from the ensuing detailed description of the preferred embodiments, taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a safety plug adapter, according to the invention, connected between an electric output box receptacle and an electric cord plug.

FIG. 2 is a plan view of the plug adapter of FIG. 1, with the top portion of the adapter housing removed to show interior elements of the plug adapter.

FIGS. 3-6 are partial sectional views of engaging elements of the plug adapter and receptacle face plate, for various embodiments of the invention.

FIG. 7 is a partial plan view of another embodiment of the invention showing adjustable length straps for securing the cord plug of an electrical device to the plug adapter.

FIG. 8 is a perspective view of another embodiment of the invention, which the plug adapter includes a receptacle cover plate.

FIG. 9 is a partial sectional view of the embodiment of FIG. 8.

FIG. 10 is a plan view of another embodiment, in which the plug adapter includes a manual switching device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1 and 2, a safety plug adapter 10 includes an adapter housing 12 of electrically insulating material. Three electrically conductive contact prongs 14, 16, 18, which extend outward through one end of the housing 12, are disposed as a single phase, three prong, polarized electric plug, which is insertable into a standard single phase, grounded, polarized outlet box receptacle 20. When these prongs 14, 16, 18 are so engaged, the contact prong 14 is connected to an energized line of a single phase, low voltage, distribution system, the contact prong 16 is connected to the ground line of the power distribution system, and the contact prong 18 is connected to a contact of the outlet box receptacle which is separately grounded.

Three contact members 22, 24, 26 are disposed within the adapter housing 12 adjacent respective openings 28, 30, 32, through an opposite end of the adapter housing 12, which form, with the contact members 22, 24, 26, a single phase, grounded polarized electrical receptacle, similar to the outlet box receptacle, for receiving either a two-prong or three-prong polarized, single phase electric plug connected by an electric cord to an electrical device.

The safety plug adapter 10 also includes a known overcurrent protection device such as a bimetallic thermally-operated switching device 34 having a manual reset button 36 extending through an opening 38 on one side of the adapter housing 12. The system ground contact prong 16 is connected to the contact member 24 by an electrically conductive member 40, and the separately grounded contact prong 18 is connected to the contact member 26 by another electrically conductive member 42. An electrically-actuated light-emitting device 35, such as an incandescent or neon lamp, or a light-emitting diode, is disposed within or adjacent to, an opening 46 of an opposite side of the adapter housing 12 and is electrically connected between the contact prongs 14 and 16. The safety plug adapter 10 also includes a flexible strap 48 having one end 50 affixed to the opposite side of the adapter housing 12, and having a free end 52 which is adapted for connection to the electric cord of an electrical appliance or device. For example, the free end 52 of strap 48 may have a flexible serrated portion 54 which can be wrapped around the electric cord of an electrical device and secured within an opening 56 of the strap 48. This is illustrated in FIG. 1, which shows an electric cord 58 of an electrical device which is electrically connected to the contact members 22, 24, 26 of the safety plug adapter 10 by a three-prong polarized connector plug 60, and which is

also mechanically connected to the safety adapter 10 by the flexible strap 48.

FIG. 1 shows a conventional electrical outlet box 62, having two single phase, grounding type polarized electric plug receptacles 20 mounted therein, and a face plate 64, having two receptacle access openings 66 to allow the insertion of connector plugs into the receptacles 20. Also, the face plate 64 includes four notched portions 68 disposed on opposite sides of the face plate 64 adjacent to the receptacles 20, which define and allow access to four flanged portions 70 of the face plate 64. The safety plug adapter 10 includes two spring-loaded engaging elements 72 disposed on opposite sides of the adapter housing 12. Each engaging element 72 has one end affixed to the adapter housing 12 and an opposite free end 74 which is spring-loaded to engage an adjacent one of the face plate flange portions 70 when the safety adapter plug 10 is fully inserted into one of the outlet box receptacles 20, as shown in FIG. 1. The engaging elements 72 may be formed of resilient material, such as spring steel, to provide its own spring loading. As shown in FIGS. 1 and 3, the safety plug adapter 10 cannot be disconnected from the outlet box receptacle 20 solely by pulling on the safety plug adapter 10, since the bent ends 74 of the two engaging elements 72 will engage the flange portions 70 of the face plate 64 to prevent such disengagement. Rather, opposite, outwardly directed forces must be applied to the engaging elements 72 so that these engaging elements 72 clear the face plate flange portions 70 while a force in another direction is applied to the safety plug adapter 10 to disengage it from the outlet box receptacle 20.

FIG. 4 illustrates a variation of these engaging elements 72 in which the notched portions 68 of the face plate 64 are replaced by the openings 76 through the face plate 64 which define the flanged portions 70 of the face plate, and the engaging elements 72 are spring-loaded in an outward direction. Thus, the free ends of the two engaging elements 72 must be pressed inwardly so that these free ends 74 can be inserted in the openings 76 when the plug adapter 10 is inserted into the outlet box receptacle 20. Then, in order to remove the plug adapter 10 from the outlet box, the free ends of the engaging elements 72 as shown in FIG. 4 must be pressed inwardly to disengage these free ends 74 from the flanged portions 70.

FIG. 5 shows another variation of the adapter engaging elements 72 and the face plate flanged portions 70, in which the face plate 64 is formed of molded material and has L-shaped extensions 78 which define the flanged portions which are engaged by the free ends 74 of the engaging element 72. Also, as shown in FIG. 6, the flanged portions 70 may be defined by a formed metal plate 80 which is connected to a conventional face plate 82 by the same mounting screw 84 which is used to connect the face plate 82 to the outlet box 62.

FIG. 7 illustrates another variation of the invention in which two adjustable length, flexible straps 86, 88, which are disposed on opposite sides of the adapter housing 12, are used instead of the single flexible strap 48 to secure the safety plug adapter 10 to the electric cord plug of an electrical appliance or device. The straps 86, 88 are adjustably connected to the adapter housing 12. For example, the end 90 of the flexible strap 86 or 88 may be serrated for insertion through an opening 92 of a bracket 94 affixed to the side of the adapter housing 12. Also, the free end 96 of the strap 86 or 88

can be serrated so that they can be inserted and anchored within an opening 98 of the other flexible strap 86 or 88. By using two such adjustable straps, the connection plug of the electrical appliance or device can be tightly secured to the safety plug adapter 10.

In the embodiment illustrated in FIGS. 8 and 9, a receptacle cover plate 100 of electrically insulated material is slideably mounted on the receptacle end of the adapter housing 12. The adapter housing 12 is formed to define parallel grooves 102, 104 within which opposite sides of the receptacle cover plate 100 extend. These parallel grooves 102, 104 serve as guides for the receptacle cover plate 100 and define a linear path of travel for the receptacle cover plate 100. A pin 106, which is affixed at one end to the receptacle cover plate 100, extends from the receptacle cover plate 100 through an elongated opening or slot 108 to an opposite end which is connected to one side of the adapter housing 12 by a spring 110. The slot 108 determines two extreme positions of the receptacle cover plate 100 and the spring 110 exerts a force on the receptacle cover plate 100 to maintain it in a first one of these two extreme positions.

The receptacle cover plate 100 has three openings 112 and 114, 116 of the same size, shape, and relative spacing as the openings 28, 30, 32, respectively, for receiving a single phase, three prong polarized electric plug. When the receptacle cover plate 100 is disposed in its second extreme position, or opened position, the openings 112, 114, and 116 of the receptacle cover plate 100 are aligned with the openings 28, 30, 32, respectively, of the adapter housing 12, so that a three prong, polarized electric plug can be inserted through both sets of openings to make contact with the contact members 22, 24, 26, respectively, disposed within the adapter housing 12.

To connect the plug and cord of an electrical appliance or device to the safety plug adapter 10, having a receptacle cover plate 100 as shown in the embodiment of FIGS. 8 and 9, it is necessary to move the receptacle cover plate 100 to its second position to allow entrance of the appliance plug into the adapter receptacle. Conversely, when this appliance plug is disconnected from the safety plug adapter 10, the receptacle cover plate 100 will be automatically moved into its first extreme position, or closed position, at which all of the receptacle openings 28, 30, 32 are covered by the cover plate 100.

There are many variations of a movable receptacle cover plate in addition to the receptacle cover plate 100 described herein. For example, the receptacle cover plate could be pivotally connected to the adapter housing 12 for pivotal movement between its opened and closed position, rather than movement along a linear path of travel. The receptacle cover plate could be moved along a linear path of sufficient length so that it completely clears the electric cord connecting plug, in which case, the openings 112, 114, and 116 would be unnecessary. Additional features could be included to make it still more difficult for a small child to uncover the adapter receptacle openings 28, 30, 32. For example, the parallel grooves 102, 104 could be slightly offset to be spaced further apart when the receptacle cover plate is in its closed position, so that it is necessary to raise the receptacle cover plate 100 slightly to clear an offset shoulder before the receptacle cover plate 100 can be moved to its opened position, or locking pawl members may be pivotally connected to the adapter housing 12 for rotation by gravity or spring means to hold the

receptacle cover plate in its closed position so that these members must be rotated to allow the receptacle cover plate to be moved to its opened position.

Since many electrical appliances do not have on/off switches but are merely plugged into an electrical circuit, an additional single pole switch 118, having an operating handle 120 extending through an opening 122 of the adapter housing 12, can be disposed within the adapter housing 12 and connected electrically in series with the thermal overload device 34, as shown in FIG. 10. Also, to provide some degree of overcurrent protection even when the outlet box receptacle 20 has been improperly wired, an additional fuse 124, having an ampere rating at least twice that of the thermal switching device 34, can be disposed within the adapter housing 12 and connected electrically between the system ground contact prong 16 and the contact member 24. Assuming the outlet box receptacle 20 is correctly wired, the thermal overload device 34 will always operate before this additional fuse 124 is damaged. However, if the receptacle 20 has been incorrectly wired so that an overload or fault current will not flow through the thermal overload device 34, the additional fuse 124 will operate to open the circuit.

Also shown in FIG. 10 are two light emitting devices rather than one, namely, the primary device 35 and a secondary device 35a similar to the primary device and electrically connected between the contact prongs 22 and 24. The secondary device is shown to be located at one end of the adapter housing opposite that where the primary device is located and is adjacent a suitable opening 46a.

The primary light emitting device enables one to know whether or not the power supply is on or off, whereas the secondary light emitting device when lit informs the user of the adapter that the power supply is on and further that the breaker is set, the fuse 104 is operational or unblown, and the switch 118 is in the "on" position. If the secondary light is not on, then either the switch is off, the breaker has been kicked open, or the fuse has been blown due to overload or short circuiting through the adapter.

If the primary device is lit and the appliance or unit fails to operate then either the unit is not plugged in or it has a malfunction.

If both the primary and secondary devices are off, that is, no light from either is emitted, then either the fuse is blown, the breaker is kicked open, or the electric power is off.

The foregoing relates to a preferred exemplary embodiment of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims. What is claimed and desired to be secured by letters patent of the United States is:

1. In combination, an outlet face plate assembly and a safety plug adapter for an electrical outlet box containing at least one receptacle for receiving a single phase, three prong, polarized electric plug, each receptacle having three recessed contacts for engaging the three plug prongs, respectively, the three receptacle contacts including a first contact connected to an energized line of a power system, a second contact connected to a ground line of the power system, and a third contact separately connected to ground, wherein the face plate assembly defines an access opening to each receptacle and includes first and second flanged portions disposed

on opposite sides of each access opening and mounting means for securing the face plate to the outlet box, and the safety plug adapter comprises:

an adapter housing formed of electrically-insulating material;

first, second, and third contact prongs, extending outwardly from one end of the housing, which are shaped and spaced relative to one another to engage the first, second, and third receptacle contacts in said electrical outlet box, respectively;

fourth, fifth and sixth contact members secured within the adapter housing at an opposite end thereof from said first, second and third contact prongs and spaced the same as the first, second and third contact prongs, respectively, the adapter housing and the fourth, fifth and sixth contact members constituting another receptacle for receiving a single phase, three prong, polarized electric plug;

a first electrically conductive connecting line for connecting the first contact prong and the fourth contact member, which includes an overcurrent protection means in said first electrically conductive connecting line for opening the first connecting line upon the occurrence of an overcurrent flowing therethrough, and a reset means for resetting said overcurrent protection means upon opening,

second and third electrically conductive connecting lines for connecting the second and third contact prongs with the fifth and sixth contact members, respectively;

first and second resilient engaging means, disposed on opposite sides of the housing, for engaging the safety plug adapter with the face plate, the first and second engaging means having first ends affixed to the housing, and second ends for resiliently engaging the first and second flanged portions, respectively, of the face plate assembly; and

restraining means, affixed to the adapter housing, for holding an electrically insulating cover means against the opposite end of the adapter housing relative to said prongs in a position at which the adapter receptacle openings are covered by the cover means.

2. A combination, as described in claim 1, wherein the cover means is a single phase electric cord plug which is inserted into the adapter receptacle, and the restraining means comprises at least one elongate flexible member having one end affixed to the adapter housing and an opposite end adapted for connection to the electric cord adjacent the plug thereof to prevent removal of said plug.

3. A combination, as described in claim 1, wherein: the cover means is a receptacle cover plate

which is movably disposed on the adapter housing at the opposite end thereof;

the safety plug adapter further comprises guide means, disposed at the opposite end of the adapter housing, for movably connecting the receptacle cover plate to the adapter housing for movement between a closed position at which the receptacle cover plate covers the adapter receptacle openings and an opened position at which an electric cord plug may be inserted into the adapter receptacle; and

the restraining means comprises spring means for exerting a bias force on the receptacle cover plate to maintain the receptacle cover plate in its closed position.

4. A combination, as described in claim 3, wherein the safety plug adapter further comprises at least one elongate flexible member having one end affixed to the adapter housing and an opposite end adapted for connection to an electric cord having a connection plug inserted into the adapter receptacle.

5. A combination, as described in claim 1, wherein the safety plug adapter further comprises voltage-actuated, light emitting means, disposed on one side of the adapter housing and electrically connected between the first and second contact prongs for indicating voltage therebetween.

6. A combination, as described in claim 5, wherein the safety plug adapter further comprises a fuse disposed in the second connecting line having a higher current rating than the overcurrent protection means.

7. A combination, as claimed in claim 6, in which: said adapter includes a second light emitting means which is electrically connected to said first connecting line between said overcurrent protection means and said fourth contact member, and to said second connecting line between said fuse and said fifth contact member in order to determine operability of said fuse and said overcurrent protection means.

8. A combination, as described in claim 1, wherein the safety plug adapter further comprises a fuse disposed in the second connecting line having a higher current rating than the overcurrent protection means.

9. A combination, as described in claim 1, wherein the first connecting line of the safety plug adapter further comprises switch means connected in series with the overcurrent protection means.

10. A combination, as described in claim 1, wherein the overcurrent protection means is a switching means which is actuated by an overcurrent flowing therethrough to open the first connecting line, the switching means including a manual re-set button extending through an opening defined by the adapter housing on one side thereof.

11. A combination, as described in claim 1, wherein the overcurrent protection means is a fuse.

* * * * *

EXHIBIT B

United States Patent Number 3,888,439 to Tuttle. This reference was originally entered in the record by the Examiner in a list of references cited by the Examiner (PTO-892 form) on November 29, 2004, accompanying a final Office Action.

- [54] CONDUIT HANGER ASSEMBLY FOR
AUTOMOTIVE AND SIMILAR USES
- [75] Inventor: Thomas J. Tuttle, Cavanaugh Lake,
Chelsea, Mich.
- [73] Assignee: Rockwell International Corporation,
Pittsburgh, Pa.
- [22] Filed: Mar. 30, 1972
- [21] Appl. No.: 239,691

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- [52] U.S. Cl. 248/54 R; 180/64 A; 248/62;
248/74 A
- [51] Int. Cl.² F16L 3/02
- [58] Field of Search 248/58, 62, 63, 74 A, 74 R,
248/228, 316, 54 R, 50, 317, 49; 180/64 A

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Primary Examiner—Roy D. Frazier

Assistant Examiner—Rodney H. Bonck

[57] ABSTRACT

A simply constructed inexpensively manufactured hanger assembly for exhaust system components of automotive vehicles such as exhaust pipes and mufflers and for similar conduits, which is preferably angularly adjustable, and which is effective to provide both thermal and vibrational isolation of the conduit from its support.

4 Claims, 2 Drawing Figures

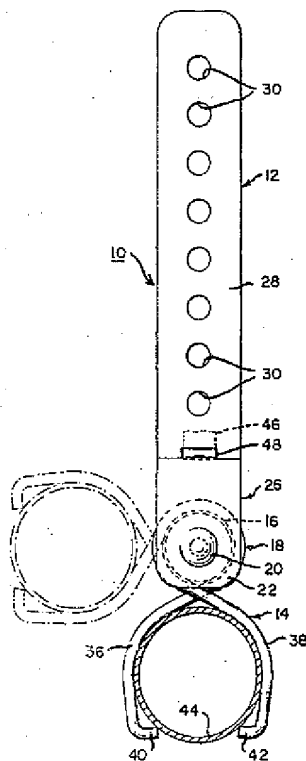


Fig. 1.

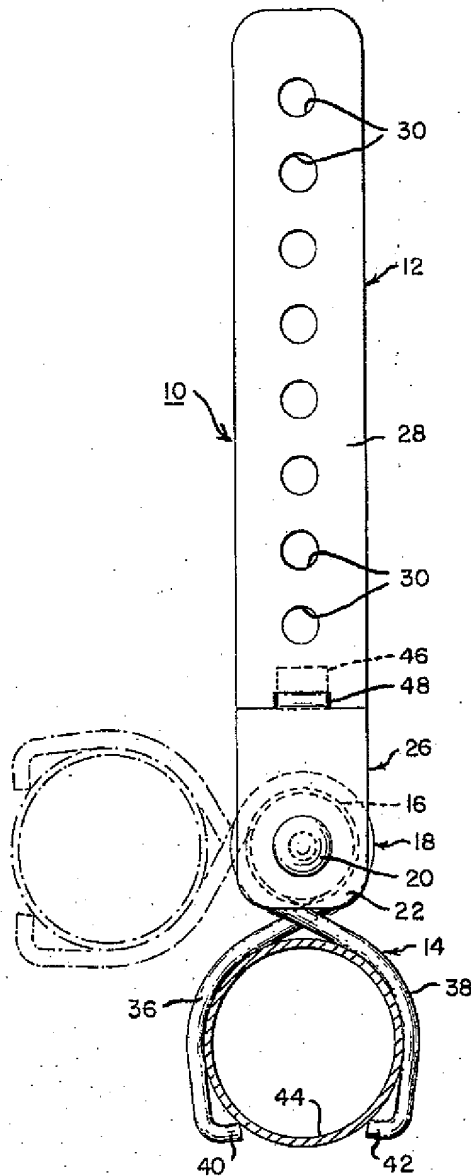


Fig. 2.

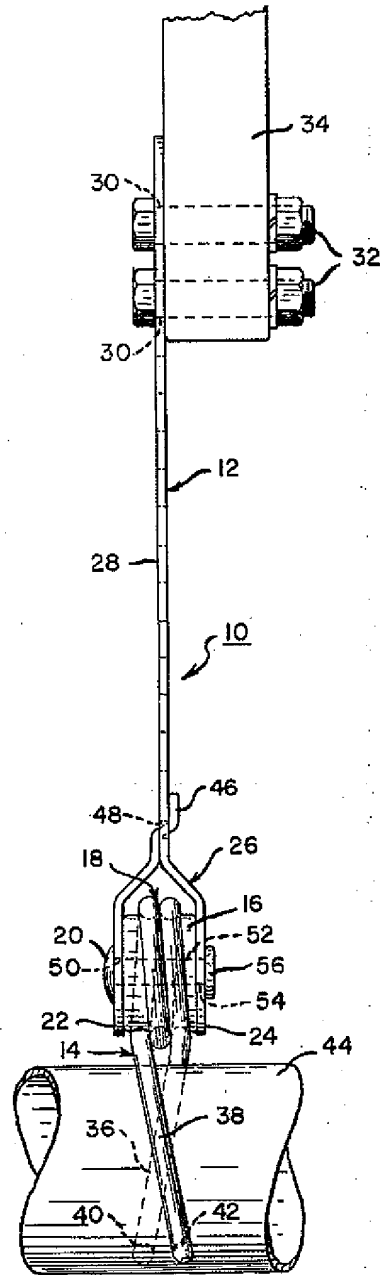


Fig. 4.

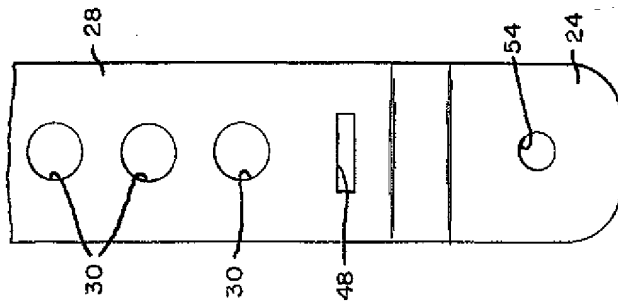


Fig. 3.

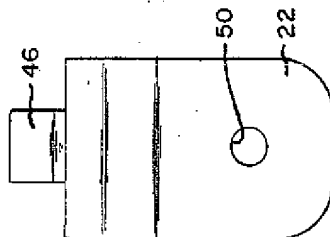


Fig. 5.

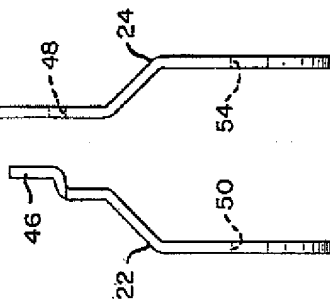


Fig. 6.

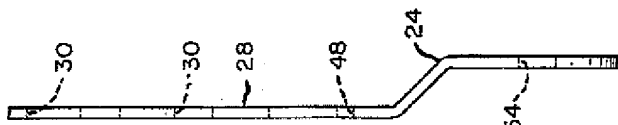


Fig. 7.

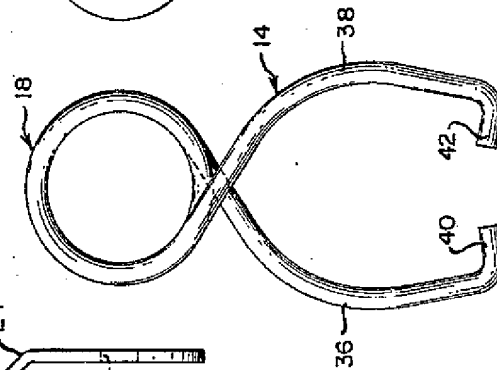


Fig. 8.

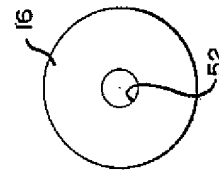
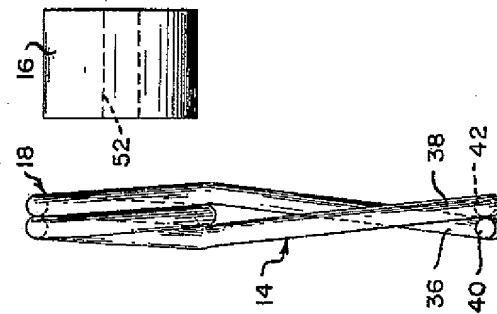


Fig. 9. Fig. 10.



CONDUIT HANGER ASSEMBLY FOR AUTOMOTIVE AND SIMILAR USES

BACKGROUND OF INVENTION

Hangers for conduits have taken a variety of forms in the past. Typical examples will be found in U.S. Pat. No. 316,922 issued Apr. 28, 1885 to H. Trask for "Pipe Hanger", U.S. Pat. No. 447,297 issued Mar. 3, 1891 to R. C. Carpenter for "Pipe Hanger", U.S. Pat. No. 947,441 issued Jan. 25, 1910 to R. Hankin et al for "Beam Clamp and Hanger", and U.S. Pat. No. 1,255,219 issued Feb. 5, 1918 to C. A. Pedersen for "Stovepipe Hanger".

Recently it has been proposed to use as a conduit hanger a coil type torsion spring having extensions from each end shaped similarly to and coacting in the general manner of slightly open tongs, the tips of the opposed tongs being spaced apart so that the conduit may be inserted between the tongs by pressure forcing the tongs apart. Once the conduit is fully seated between the tongs, the torsion spring causes the tongs to contract and firmly grip the conduit. The tips of the tongs are inwardly turned to firmly grip the conduit to prevent its inadvertent disengagement from the torsion spring hanger tong. This has proved to be a very reliable and economical device for holding exhaust pipes, mufflers and similar conduits of automotive vehicles.

As heretofore constructed such devices have, despite their merits, not been generally accepted. As heretofore constructed the heat of the conduit supported by the tongs is transmitted to the vehicle structure on which the tongs are mounted. Similarly, vibration of a conduit is also transmitted through the hanger having a torsion spring hanger tong to the support and the vehicle body. Neither result is acceptable from the vehicle passenger's viewpoint.

The present invention overcomes these disadvantages of the torsion spring hanger tongs as previously constructed by providing an improved support in which the torsion spring is completely isolated both thermally and vibrationally from the strap of the hanger assembly so that neither noise nor heat can be transmitted from the conduit to its support.

More specifically, this result is achieved simply and economically by relatively few interfitting parts which can be finally assembled by but a single fastening device, such as a rivet.

An additional feature of this invention is that the hanger tongs are angularly adjustable relative to the strap before the conduit is in place between the tongs but which is firmly retained in its selected angular position while the conduit is being inserted in the hanger and after it has been so inserted.

DESCRIPTION OF DRAWINGS

FIG. 1 is a plan view of the hanger tong assembly of the present invention showing the manner in which it supports a conduit such as an exhaust pipe;

FIG. 2 is a side elevational view of the structure of FIG. 1;

FIG. 3 is a plan view of one of the arms of the yoke portion of the strap;

FIG. 4 is a plan view of the other yoke portion of the strap;

FIG. 5 is a side view of the yoke arm shown in FIG. 3;

FIG. 6 is a side view of the strap and other yoke arm as shown in FIG. 4;

FIG. 7 is a plan view of the torsion spring hanger tongs;

FIG. 8 is an end view of the grommet which fits within the coil of the tongs of FIG. 7;

FIG. 9 is a side view of the tongs of FIG. 7;

FIG. 10 is a side view of the grommet of FIG. 8.

DESCRIPTION OF INVENTION

Referring now in detail to the drawings, the hanger assembly 10 of the present invention comprises a strap 12, a torsion spring hanger tong 14, a grommet 16 of elastomeric material received within the coil 18 of the hanger tong 14 and a fastener rivet 20 extending through the bore of the annular grommet 16 and the spaced arms 22 and 24 of the yoke portion 26 of the strap 12.

The upper portion 28 of the strap 12 is provided with a plurality of through apertures 30 through which may be inserted bolts 32 to secure the strap upper portion 28 to a suitable support 34 as is most clearly illustrated in FIG. 2.

The depending arms 36 and 38 of the hanger tongs 14 are formed at their lower ends with inwardly turned opposed tips 40 and 42, respectively, forming teeth as shown in FIG. 1.

In use, the conduit 44 to be supported is forced between the tips 40 and 42 of the arms 36 and 38 causing the arms to expand and permit insertion of the conduit 44 to the position shown in FIGS. 1 and 2. In that position the arms 36 and 38 resiliently contract under the influence of the coil 18 acting as a torsion spring to firmly grip the conduit 44 as illustrated in FIGS. 1 and 2, the teeth 40 and 42 engaging the bottom of the conduit 44 to prevent its inadvertent disengagement from the arms 36 and 38 as due to vibration.

Referring now to FIGS. 7 through 10, inclusive, the tongs 14 are so formed that contraction of the arms 36 and 38 toward each other will increase the internal diameter of the coil portion 18 and separation of the arms 36 and 38 will cause contraction of the internal diameter of the coil 18. In the normal unstressed condition of the hanger tong 14, as shown in FIGS. 7 and 9, the internal diameter of the coil portion 18 is slightly (0.090 inch for example) less than the outside diameter of the grommet 16. The grommet 16 is placed within the coil 18 in the position shown in FIGS. 1 and 2 by expanding the internal diameter of the coil 18 as just described, inserting the grommet 16, and allowing the coil 18 to return to its unstressed condition as shown in FIGS. 7 and 9. In this position there is a light interference fit between the grommet 16 and the internal surface of the coil 18 inhibiting relative rotation therebetween.

The structure of the hanger strap 12 is best illustrated in FIGS. 3 through 6, inclusive. As is shown in FIGS. 4 and 6, the upper portion 28 of the strap and the yoke arm 24 are formed by a single metal stamping, the arm 24 being laterally offset from the upper portion 28. The yoke arm 22 is provided by a separate piece, also a metal stamping, and has at its upper end a projecting tongue 46 laterally offset from the arm 22 and adapted to fit through a through-slot 48 in the upper portion 28 of the strap 12, as is most clearly shown in FIGS. 1 and 2.

With continued reference to FIGS. 1 and 2, it is now apparent that assembly of the hanger assembly 10 is effected by inserting the tongue 46 through the slot 48, placing the coil 18 of the hanger tongs 14 with the grommet 16 therein between the arms 22 and 24 of the yoke portion 26 of the strap 12, inserting the rivet 20 through the aligned apertures 50, 52 and 54 of the arm 22, grommet 16 and arm 24, respectively, and thereafter upsetting the projecting end of the rivet 20 to form an opposed head as indicated at 56.

In this final assembly the grommet 16 is axially compressed between the arms 22 and 24 of the yoke 26 and is firmly frictionally retained therebetween and against the rivet 20 so that the grommet 16 cannot rotate relative to the arms 22 and 24. Angular adjustment of the tongs 14 relative to the strap 12 is still possible by contracting the arms 36 and 38 of the tongs 14 to expand the internal diameter of the coil 18 to reduce the frictional engagement between the coil 18 and the grommet 16 and, when the tongs 14 are in their desired relative angular position with reference to the strap 12 such as the position shown in phantom in FIG. 1, releasing the arms 36 and 38 to their unstressed position.

As is apparent from FIG. 1, insertion of the conduit 44 into the tongs 14 expands the arms 36 and 38 causing the coil 18 to more tightly contract about the grommet 16 and thereby immobilize the tongs 14 relative to the strap 12.

The grommet 16 in the structure of the present invention completely isolates the tongs 14 from metal to metal contact with the rivet 20, and any portion of the strap 12. It thus precludes transmission of vibration from the conduit 44 to the strap 12 and the support 34 and similarly precludes transmission of heat from the conduit 44 through the hanger tongs 14 to the strap 12 and the support 34. This is extremely important in automotive application where the hanger assembly 10 of the present invention is used to support the engine exhaust pipes, the muffler, and other components of the exhaust system. To support a muffler, a pair of the hanger assemblies 10 are provided, one at each end of the muffler, the tongs 14 of these two assemblies gripping the projecting generally cylindrical inlet and outlet extensions at opposite ends of the muffler.

What is claimed is:

1. A conduit hanger assembly for automotive exhaust system components and the like including elongate fastening means adapted adjacent one end to be secured to a support structure, an annular elastomeric member, connecting means securing said elastomeric member to the other end of said fastening means, and a spring hanger comprising a torsion spring having a coil body and arms which are integral extensions of the opposite ends of the coil ends which form spaced apart tong arms between which an exhaust system component can be inserted to expand and be gripped by the tong arms, the coil body of said hanger being positioned about the

periphery of said elastomeric member in frictional engagement therewith, the internal diameter of said coil body in an unstressed condition being less than the outside diameter of said elastomeric member whereby, by contraction of said tong arms forming spring extensions the frictional engagement between said coil and said elastomeric member can be reduced sufficiently to permit relative angular adjustment between said elastomeric member and said hanger and whereby expansion of the coil tong arm causes contraction of said coil into tighter immobilizing frictional engagement with said elastomeric member.

2. The conduit hanger of claim 1 wherein said connecting means extends through the body of said elastomeric member and said connecting means, elastomeric member and spring hanger coil body are concentrically oriented.

3. The conduit hanger of claim 1 wherein said fastening means includes a yoke between the arms of which said elastomeric member is compressed and upon which said elastomeric member is fixed by said connecting means supported at its opposite ends by the yoke arms and extending through the elastomeric member.

4. A conduit hanger assembly for automotive exhaust system components and the like including elongate fastening means adapted adjacent one end to be secured to a support structure to position said fastening means such that its longitudinal axis lies substantially vertically, an annular elastomeric member, connecting means securing said elastomeric member to the other end of said fastening means, and a spring hanger comprising a torsion spring having a coil body and arms which are integral extensions of the opposite ends of the coil ends which form spaced apart tong arms between which an exhaust system component can be inserted to expand and be gripped by the tong arms, the coil body of said hanger being positioned about the periphery of said elastomeric member in frictional engagement therewith, the internal diameter of said coil body in an unstressed condition being less than the outside diameter of said elastomeric member whereby, by contraction of said tong arms forming spring extensions the frictional engagement between said coil and said elastomeric member can be reduced sufficiently to permit relative angular adjustment between said elastomeric member and said hanger by pivotally swinging said hanger about said elastomeric member such that an exhaust component gripped by said arms will be laterally offset relative to said vertical axis and whereby expansion of the coil tong arm causes contraction of said coil into tighter immobilizing frictional engagement with said elastomeric member and the holding of said exhaust component against the force of gravity laterally offset from said vertical axis.

* * * * *

EXHIBIT C

United States Patent Number 5,573,420 to Grosswendt. This reference was originally entered in the record by the Examiner in a list of references cited by the Examiner (PTO-892 form) on November 29, 2004, accompanying a final Office Action.



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United States Patent [19]

Grosswendt

[11] Patent Number: 5,573,420
[45] Date of Patent: Nov. 12, 1996

[54] **ELECTRICAL CORD AND ELECTRICAL PLUG SECURER**

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[21] Appl. No.: 360,996

[22] Filed: Dec. 20, 1994

[51] Int. Cl.⁶ H01R 13/62

[52] U.S. Cl. 439/371; 439/369; 24/16 PB

[58] Field of Search 439/371, 368 M, 439/369 M; 24/168 B

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Primary Examiner—Gary F. Paumen

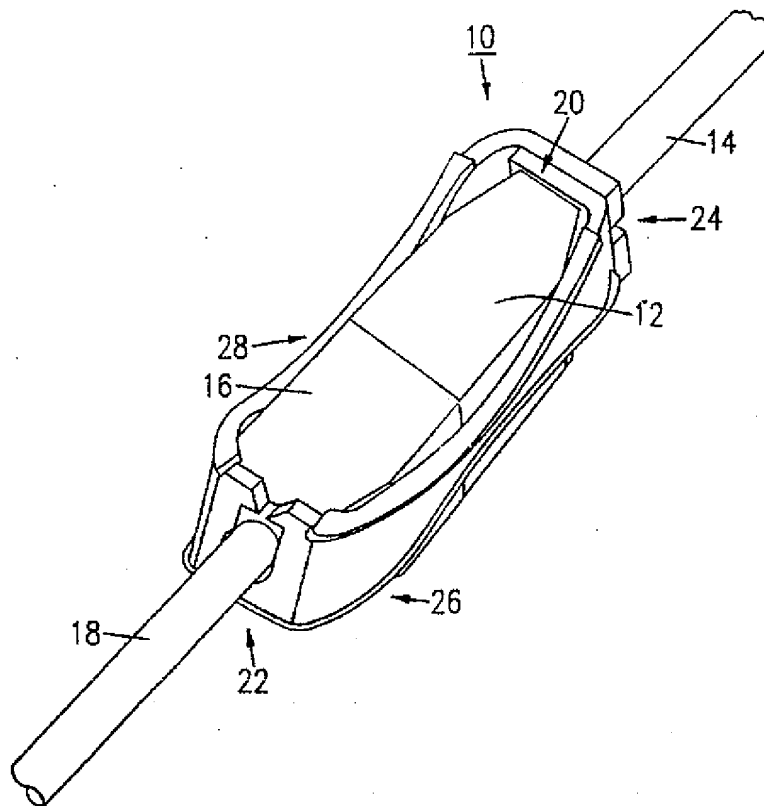
Assistant Examiner—T. C. Patel

Attorney, Agent, or Firm—Denton L. Anderson; David A. Farah; Sheldon & Mak, Inc.

[57] **ABSTRACT**

A device for securing together a plurality of cords and for securing together a plurality of loops of one or more cords comprising a disk-shaped first connector with a central opening and an access notch, and a first strip attached to the first connector. The plurality of cords or cord loops can be secured by wrapping the securing device around the cords or loops and then inserting a portion of the first strip into the central opening via the access notch. A securing device suitable for securing together a first plug with a second plug comprising a first connector attached to a first strip, a second connector attached to both the first strip and a second strip and a third connector attached to the second strip. Each connector has a central opening and an access notch. The first and second plugs can be secured together by inserting the first cord into the first central opening via the first access notch, inserting the second cord into the second central opening via the second access notch, and inserting the first cord into the third central opening via the third access notch, thereby placing inward axial tension on the plugs securing them together.

24 Claims, 1 Drawing Sheet



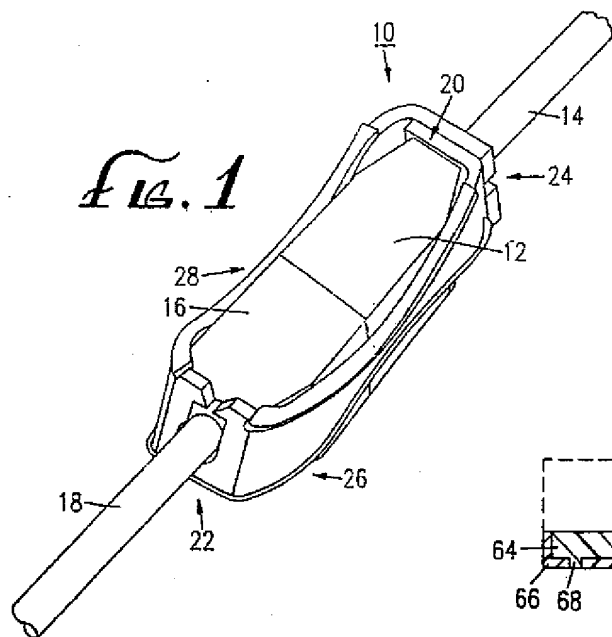


Fig. 1

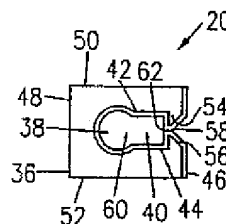


Fig. 7

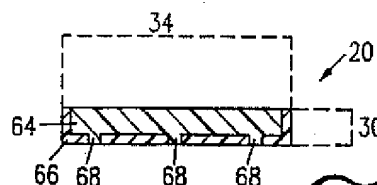


Fig. 4

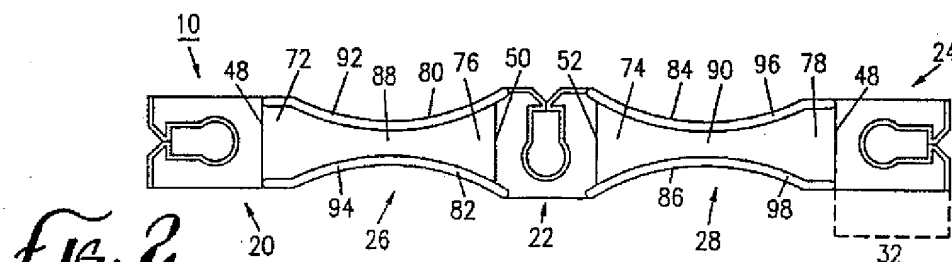


Fig. 2

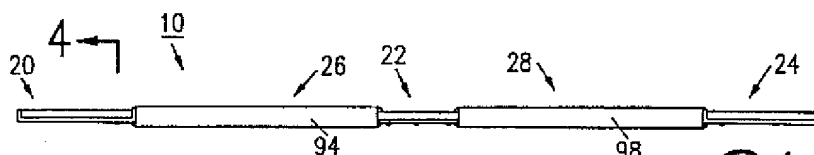


Fig. 3

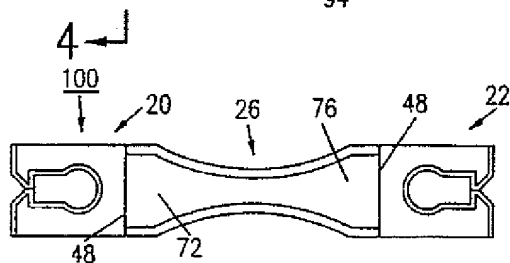


Fig. 5

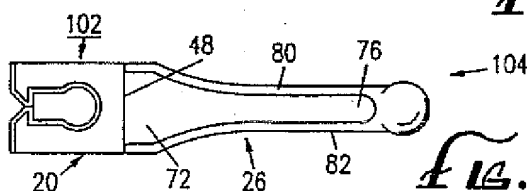


Fig. 6

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ELECTRICAL CORD AND ELECTRICAL PLUG SECURER

BACKGROUND

This invention relates to devices for securing together a plurality of cords and for securing together a plurality of loops of one or more cords, and to devices for securing together male and female plugs of electrical cords to avoid unintentional separation.

Electrical equipment frequently needs to be operated at a distance from an electrical outlet that exceeds the length of the equipment's integral electrical cord. Electrical extension cords are used to increase the range of the integral electrical cord, typically by connecting the male plug of the integral cord to the female plug of the extension cord and by connecting the male plug of the extension cord to the electrical outlet. This arrangement is disadvantageous in that excessive outward axial tension on the integral electrical cord plug and the extension cord plug will tend to undesirably separate the plugs.

Also, after being used, an electrical cord or plurality of cords are frequently stored by placing the cords or the loops of one cord on top of each other to form a coil or bundle. This coil or bundle arrangement conserves storage space, allows the cord or cords to be conveniently hung from a support and makes the cord or cords easier to transport. In order to maintain the coil or bundle, it is advantageous to secure the cords or loops of a cord together such that the coil or bundle structure remains intact.

There are a variety of methods used to prevent accidental disengagement of a male plug from a female plug and for keeping a plurality of cords or the loops of a cord in a coil or bundle structure or in close proximity to each other. Such methods include taping the two plugs together as well as using devices specifically designed to prevent disengagement. Similarly, the cords or loops of a cord can be tied together with rope or taped together.

The use of tape on either plugs or cords often disadvantageously leaves adhesive residue on the plugs or cords and the tape is generally not reusable. In addition, both rope and tape can be time consuming to apply and vary in their effectiveness between applications. Further, devices designed to prevent accidental separation of two plugs generally do not also function to maintain a plurality of cords or loops of a cord in a coil or bundle.

Therefore, it would be advantageous to have a single device which could be used to secure a male and female plug together during use of electrical equipment thereby preventing accidental separation upon the application of outward axial tension, as well as being useful for joining a plurality of cords together or a plurality of loops of a single cord, such as for storage or transportation between uses. Ideally, such a device would be easy to apply, reusable, easy and inexpensive to produce, predictable in the strength of its application, and both nonconductive and water resistant to render it suitable for electrical uses and for uses around water.

SUMMARY

The present invention is directed to a device that satisfies these needs. The apparatus can be used for securing together a plurality of cords and for securing a plurality of loops of one or more cords. In addition, some embodiments of the device can be used for securing together the plugs of electrical cords.

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In a preferred embodiment, the apparatus comprises a disc-shaped first connector disposed within a reference plane. The first connector is substantially inflexible and nonelastic, and has a central opening and an access notch. The access notch allows a member disposed perpendicular to the reference plane to be inserted into the central opening. The access notch includes a pair of opposing teeth disposed in close proximity within the reference plane. The first connector can further comprise two or more adjoining layers, one layer of which functions to impart substantial inflexibility and nonelasticity to the first connector.

The securing device further comprises a first strip having a first end and an opposing second end, and two lateral edges. The first strip is substantially flexible and elastic, and is attached to the first connector at the first end.

A plurality of cords or cord loops can be secured by wrapping the securing device around the cords or cord loops and then inserting a portion of the first strip into the central opening of the first connector via the access notch. The first strip is retained within the central opening by the opposing teeth.

In order to further promote retention of the first strip within the central opening, the first strip can be provided with a tapered central portion, ridges on the lateral edges of the strip or a knob-like structure at the second end.

In another preferred embodiment, the securing device comprises, in addition to the first connector and a first strip as described above, a second connector with a second central opening and second access notch similar to the first connector. The second connector is attached to the second end of the first strip.

In addition to securing together a plurality of cords and to securing together a plurality of loops of one or more cords, this embodiment can also be used for securing together a first plug attached to a first cord with a second plug attached to a second cord. Two plugs can be secured together by inserting the first cord into the first central opening via the first access notch and then inserting the second cord into the second central opening via the second access notch. In so doing, the first strip is stretched thereby imparting inward axial tension on the plugs securing them together against the application of excess outward axial tension. The cords attached to the plugs are retained within their respective connectors by the opposing teeth.

In another preferred embodiment, the securing device comprises a first connector, a first strip and a second connector as described immediately above. In addition, it comprises a second strip having a first end and a second end, which is substantially flexible and elastic like the first strip. The device also comprises a third connector, similar to the first and second connector, having a third central opening and third access notch. The second connector is attached to the first end of the second strip. The third connector is attached to the second end of the second strip.

In addition to securing together a plurality of cords and to securing together a plurality of loops of one or more cords, this embodiment of the present invention can be used for securing together a first plug attached to a first cord with a second plug attached to a second cord. A first plug attached to a first cord can be secured to a second plug attached to a second cord by inserting the first cord into the first central opening via the first access notch. Next, the second cord is inserted into the second opening via the second access notch thereby stretching the first strip. The first cord is then inserted into the third central opening via the third access notch, thereby stretching the second strip. The stretched first

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and second strip impart inward axial tension on the plugs preventing separation upon the application of excess outward axial tension. The cords attached to the plugs are retained within their respective connectors by the opposing teeth.

DRAWINGS

These and other features, aspects and advantages of the present invention will become better understood with regard to the following description, appended claims, and the accompanying drawings where:

FIG. 1 is a perspective environmental view of a first device having features of the invention, the device being useful for securing together a first plug attached to a first cord with a second plug attached to a second cord;

FIG. 2 is a top plan view of the device shown in FIG. 1;

FIG. 3 is a side elevational view of the device shown in FIG. 1 and FIG. 2;

FIG. 4 is a cross-sectional view through one connector of the device shown in FIGS. 1 through 3, taken through line 4-4 and illustrating a connector having two adjoined layers;

FIG. 5 is a top plan view of a second device having features of the invention, the device being useful for securing together a first plug attached to a first cord with a second plug attached to a second cord according to another embodiment of the present invention; and

FIG. 6 is a top plan view of a third device having features of the invention, the device being useful for securing together a plurality of cords and for securing together a plurality of loops of one or more cords according to one second embodiment of the present invention.

FIG. 7 is a top plan view of a connector used in the various embodiments of the present invention.

DESCRIPTION

Referring now to FIGS. 1-3, there are illustrated a perspective environmental view, a top plan view and a side elevational view, respectively, of the device 10 for securing together a first plug 12 attached to a first cord 14 with the second plug 16 attached to a second cord 18 according to one embodiment of the present invention. The device 10 comprises a first connector 20, a second connector 22, a third connector 24, a first strip 26 and a second strip 28.

Referring now to FIG. 7, there is illustrated a top plan view of the first connector 20. Other connectors used in the various embodiments of the invention, such as the second connector 22 and third connector 24, have substantially the same elements except as noted herein. Therefore, similar elements between connectors will be noted by the same numbers herein.

As can be seen in FIGS. 1-7, the first connector 20 is substantially disc-shaped with respect to a reference plane such that its height 30, perpendicular to the reference plane, is substantially less than its length 32 or width 34 within the reference plane.

When viewed from the top, as shown in FIG. 7, the external edges 36 of the first connector 20 can take on a substantially rectangular appearance. However, many other shapes are also suitable for the intended uses described herein. For example, the first connector 20 can take on a substantially round, oval, square, irregular or other shape.

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The first connector 20 comprises a central opening 38. The central opening 38 has a central opening cross-sectional area. For one method of using the present invention, a cord having a cord cross-sectional area perpendicular to its longitudinal axis is inserted into the central opening 38. Because most cords have substantially circular cross-sections, it is preferred that the central opening 38, also be substantially circular in cross-section with respect to the reference plane in order to better accommodate a cord.

The central opening cross-sectional area can be smaller than the cross-sectional area of the cord to be inserted therein, the same as the cross-sectional area of the cord to be inserted therein or larger than the cross-sectional area of the cord to be inserted therein. When the central opening cross-sectional area is smaller than the cross-sectional area of the cord to be inserted therein, the cord can still be inserted into the central opening 38 by slightly flexing the first connector 20 out of the reference plane. This flexion changes a substantially round central opening 38, with respect to the reference plane, into a substantially oval central opening 38, with respect to the reference plane, where the oval central opening cross-sectional area is larger than the round central opening cross-sectional area. When the force causing the first connector 20 to flex ceases, the central opening 38 tends to return to its original dimensions with respect to the reference plane, impinging the cord and thereby advantageously gripping the cord securely.

As will be appreciated by one with skill in the art, having a central opening 38 with a cross-sectional area larger than the cross-sectional area of the cord to be inserted therein permits greater ease of insertion of the cord into each central opening 38. Further, utilizing a central opening 38 with a relatively large cross-sectional area advantageously permits the connector to be used with cords having a greater variety of cross-sectional areas than does a central opening having a smaller cross-sectional area.

In addition to a central opening 38, the first connector 20 comprises an access notch 40 defined by two opposing sides 42 and 44. The access notch 40 serves to link the reference plane external to the first connector 20 with the central opening 38. The access notch 40 divides the first connector 20 into an access notch end 46, an end opposing the access notch 48 and two sides adjacent the access notch end 50 and 52.

The access notch 40 comprises at least one tooth 54 formed by one of the opposing access notch sides 42 and 44, and preferably two opposing teeth 54 and 56, one tooth formed by each of the opposing access notch sides 42 and 44. The tooth or teeth 42 and 44 serve to divide the access notch 40 into an outer space 58 and an inner space 60, where the outer space 58 directly communicates with the reference plane external to the first connector 20 and the inner space 60 directly communicate with the central opening 38.

The outer space 58 and the inner space 60 can take on any of a variety of shapes, which are determined by the shape of the access notch teeth 54 and 56, the central opening 38 and the outer edges 36 of the first connector 20. In a preferred embodiment, shown in FIG. 7, the access notch 40 comprises a triangular-shaped outer space 58 and a rectangular-shaped inner space 60 formed by opposing teeth 54 and 56, which closely approximate at a point 62 when the first connector 20 is not being flexed.

While each access notch 40 can be any of a variety of shapes, the triangular-shaped outer space 58, and rectangular-shaped inner space 60 combination shown in FIG. 7 is particularly preferred because the triangular-shaped outer

space 58 helps to guide a cord or other member into the central opening 38 and the rectangle-shaped inner space 60 serves to isolate the opposing teeth 54 and 56 from the cord or other member thereby tending to prevent tension on the cord from flexing the opposing teeth 54 and 56 out of the reference plane. However, as will be appreciated by one with skill in the art with reference to the disclosure herein, each access notch 40 can be any suitable shape, including shapes which lack either or both of the triangular-shaped outer space 58 and the rectangular-shaped first inner space 60. Further, the access notch 40 can comprise an outer space serving the same function as the triangular-shaped outer space 58 that has a non-triangular shape, or an inner space serving the same function as the rectangular-shaped inner space 60 but having a non-rectangular shape.

In a preferred embodiment, each connector 20, 22 and 24 is substantially inflexible and substantially nonelastic. As used herein, the terms "substantially inflexible", "substantially nonelastic" and similar phrases signify that the first connector 20 will tend not to stretch or to bend out of the reference plane when a force is applied to each connector 20, 22 and 24 through the cord or member inserted into its central opening 38. However, it is understood that each connector 20, 22 and 24 retains enough flexibility and/or elasticity such that the opposing teeth 54 and 56 can be separated sufficiently to allow the cord or member to pass through each access notch 40 into the central opening 38 when manual force is applied to the opposing teeth 54 and 56 perpendicular to the reference plane during insertion and removal of the cord or member into and out of each central opening 38.

Each connector 20, 22 and 24 can comprise any of a variety of materials suitable for the intended functions disclosed herein. In one preferred embodiment, each connector 20, 22 and 24 comprises material or materials that are nonconductive and resistant to water such that each connector 20, 22 and 24 will not tend to be damaged during its intended uses. Further, it is advantageous that each connector 20, 22 and 24 comprise material or materials that are resistant to industrial chemicals, such as solvents, to the extent that each connector 20, 22 and 24 would be used around such chemicals. In one embodiment, each connector 20, 22 and 24 comprises a substantially homogeneous material that is substantially inflexible and substantially nonelastic, such as nylon or plastic.

Referring now to FIG. 4, there is illustrated another preferred embodiment showing a cross-sectional view of a two-layer connector 20 of the device shown in FIG. 3, taken through line 4—4. As shown, connector 20 comprises a first layer 64 and a second layer 66. When a connector, such as connector 20 comprises two layers, as shown in FIG. 4, at least one of the layers imparts substantial inflexibility and substantial nonelasticity to the connector 20.

While any of a variety of materials are suitable for the layer that imparts substantial inflexibility and substantial nonelasticity, as is understood by those with skill in the art, nylon or plastic is preferred because these materials can also exhibit the properties of nonconductivity and water resistance, are inexpensive, and are easy to manufacture into a variety of shapes.

The layers of a two-or-more-layered connector are joined such that they will not tend to separate during the intended uses of the device. The layers can be joined by any of a variety of methods that is suitable for the composition of the two layers. For example, they can be joined by fasteners or adhesives, or be chemically or thermally bonded.

In one preferred embodiment of the present invention, each connector 20, 22 and 24 comprises a nylon layer 64 bonded to a rubber layer 66 by a suitable adhesive. In a particularly preferred embodiment, the nylon layer 66 comprises a plurality of protrusions 68 which penetrate the rubber layer 66, thereby assisting in aligning the two layers 64 and 66 and making the two layers 64 and 66 integral.

In addition to comprising one or two layers, each connector 20, 22 and 24 can comprise three or more layers. The number of layers and the materials comprising the layers are limited only by the physical properties necessary for proper function by the connector 20, 22 and 24, as is understood by those with skill in the art. For example, the multiple layers can have layers of identical material interspersed with a layer of non-identical material, or can have three or more layers of non-identical material.

Further, for embodiments of the present invention comprising multiple connectors 20, 22 and 24, as is shown in FIGS. 1-3 and 5, one or more connectors 20, 22 and 24 can have a different number of layers than the other connector 20, 22 and 24 or connectors. Also, one or more of the connectors 20, 22 and 24 can have layers which comprise materials different than the materials comprising the layer or layers of the other connector or connectors. Even when the multiple connectors comprise the same number and composition of layers, the layers of one connector need not be oriented identically as the layers in the other connectors.

Each connector 20, 22 and 24 should be sufficiently thick to withstand the forces inherent in its uses as disclosed herein. In a preferred embodiment, each connector 20, 22 and 24 is between about $\frac{1}{16}$ inch and $\frac{1}{2}$ inch thick, and more particularly about $\frac{1}{8}$ inch, depending on the material or materials it comprises. In another preferred embodiment, each connector 20, 22 and 24 comprises one layer of nylon and a second layer of rubber, having a joint thickness of about $\frac{1}{8}$ inch.

Each connector 20, 22 and 24 has dimensions proportioned to fit standard plugs and cords, though it can be made in a variety of sizes commensurate with the variety of plugs and cords to which the device could be applied. In one preferred embodiment, each connector 20, 22 and 24 is approximately 1 inch long and about $\frac{3}{4}$ inches wide.

Referring again to FIGS. 1-3, the device according to one embodiment of the present invention further comprises a first strip 26 and a second strip 28. Each strip comprises a first end 72 and 74, an opposing second end 76 and 78, and two lateral edges 80/82 and 84/86, respectively. The longitudinal axis of each strip lies between each first end 72/74 and second end 76/78.

In a preferred embodiment, each strip is substantially flexible and substantially elastic. As used herein, the terms "substantially flexible", "substantially elastic" and similar phrases signify that each strip will tend to stretch and to bend when a force is applied to the strip along its axis and that the strip will tend to return to its original shape when the forces ceases.

Each strip comprises materials that are substantially flexible and substantially elastic. These materials can be any of a variety of natural or synthetic substances, including woven synthetic materials, which have the necessary flexibility and elasticity. In a preferred embodiment, each strip comprise rubber. Also, in embodiments comprising more than one strip, it is preferred that all strips comprise identical material for ease of manufacture, though the strips can comprise different materials from one another.

Each strip can be any of a variety of shapes. In a preferred embodiment each strip is substantially rectangular. In

another preferred embodiment, each strip is substantially rectangular but tapered centrally, 88 and 90 for the first strip and the second strip respectively, along its axis such that each strip has a narrower profile in the center when viewed from the top as illustrated in FIG. 2, or from the bottom, not illustrated. In another preferred embodiment, at least one of the lateral edges comprises a ridge 92, 94, 96 and 98.

Each strip should be sufficiently thick to withstand the forces inherent in its uses as disclosed herein. Preferably, each strip is between about $\frac{1}{16}$ inch and $\frac{1}{2}$ inch thick, at its thinnest place depending on the materials it comprises. In a particularly preferred embodiment, each strip comprises rubber about $\frac{1}{8}$ inch thick.

Each strip has dimensions proportioned to fit standard plugs and cords, though it can be made in a variety of sizes commensurate with the variety of plugs and cords to which the device could be applied. In one preferred embodiment, each strip is approximately $\frac{3}{4}$ inches long and about $\frac{3}{4}$ inches wide at the ends tapering to about $\frac{1}{2}$ inch centrally.

FIGS. 1-3 illustrate the relationship between the connectors 20, 22 and 24 and strips 26 and 28 according to one preferred embodiment 10. The end of first connector opposing the first access notch 48 is attached to first end of the first strip 72. The second connector 22 is connected to the second end of the first strip 76 as well as the first end of the second strip 74 at alternate sides of the second connector adjacent to the second access notch 50/52. The end of the third connector opposite each access notch 48 is connected to the second end of the second strip 78.

Referring back to FIG. 1, there is illustrated one method of using the present invention for securing together a first plug 12 attached to a first cord 14 with a second plug 16 attached to a second cord 18. This is accomplished by inserting the first cord 14 into the central opening of the first connector 38 via the access notch of the first connector 40. Next, the second cord 18 is inserted into the second central opening of the second connector 38 via the access notch of the second connector 40, thereby stretching the first strip 26 in an axial direction. Finally, the first cord 14 is inserted into the central opening of the third connector 38 via the access notch of the third connector 40, thereby stretching the second strip 28 in an axial direction.

Stretching the first strip 26 and second strip 28 imparts inward axial tension on the plugs 12 and 16. This inward axial tension tends to counter outward axial tension which might accidentally separate the two plugs 12 and 16. The first cord 14 and second cord 18 are retained within the central openings of the first, second and third connectors 38 by the respective connectors' opposing teeth 54 and 56.

Referring now to FIG. 5, there is illustrated a top plan view of another embodiment of the invention 100. This embodiment can be used to secure together a first plug 12 attached to a first cord 14 with a second plug 16 attached to a second cord 18, not illustrated. As can be seen, the device 100 comprises a first connector 20, a second connector 22 and a first strip 26. The first connector 20, the second connector 22 and the first strip 26 all have the configuration and properties as described above. In this embodiment of the present invention 100, the end of the first connector opposite the first access notch 48 is attached to the first end of the first strip 72. Similarly, the end of the second connector opposite the second access notch 48 is attached to the second end of the first strip 76.

This embodiment of the present invention is used as follows. The first cord 14 attached to the first plug 12 is inserted into the central opening of the first connector 38 via

the access notch of the first connector 40. The second cord 18 attached to the second plug 16 is then inserted into the central opening of the second connector 38 via the access notch of the second connector 40 which stretches the first strip 26. Stretching the first strip 26 imparts inward axial tension on the first plug 12 and second plug 16, thereby tending to prevent separation of the plugs upon application of excess outward axial tension. The cords attached to the plugs are retained within their respective connectors by the opposing teeth 54 and 56.

Referring now to FIG. 6, there is illustrated a top plan view of still another embodiment of the invention. This embodiment 102 can be used to secure together a plurality of cords and to secure together a plurality of loops of one or more cords, not illustrated. This embodiment 102 of the present invention comprises a first connector 20 and a first strip 26 having the characteristics and properties of the connectors and strips described above. The end of the first connector opposing the access notch 48 is attached to the first end of the first strip 72. The second end of the first strip 76 can be attached to a knob-like device 104, as is illustrated in FIG. 6, or can be attached to a device having another shape (including a connector, connector plus strip or two connectors with a strip therebetween).

The embodiment 102 illustrated in FIG. 6 secures together a plurality of cords or a plurality of loops of one or more cords by first wrapping the device around the cords or loops. Next, the first strip 26 is inserted into the central opening of the first connector 38 via the access notch of the first connector 40. This action approximates the cords or loops to one another. The first strip 26 is retained within the access notch of the first connector 38 by the opposing teeth 54 and 56. To assist in maintaining the first strip 26 within the first central opening 38, the first strip 26 can be provided with one or more of a tapered central portion, a ridge or ridges on the lateral edge or edges of the first strip 80 and 82, or a knob-like 104 or otherwise shaped apparatus attached to the second end of the first strip 26.

The devices described above for securing together a first plug 12 attached to a first cord 14 with a second plug 16 attached to a second cord 18 can also be used to secure together a plurality of cords and to secure together a plurality of loops of one or more cords. These latter two functions are accomplished by using the first connector 20 and first strip 26 portion of the devices in the manner described immediately above. Alternately, for a device comprising at least two connectors and two strips as disclosed herein, a plurality of cords or a plurality of loops of one or more cords can be secured together by wrapping the device around the cords or loops and then inserting the second or sequentially later strip (rather than the first strip 26) into the central opening of the first connector 38 via the access notch of the first connector 40. The second or sequentially later strip is retained within the access notch of the first connector 40 by the opposing teeth 54 and 56 of the first connector.

When not in use, it is preferred that all connectors 20, 22 and 24 and all strips 26 and 28 are substantially coplanar. This arrangement makes storage easier than for noncoplanar embodiments of the present invention.

Although the present invention has been described in considerable detail with reference to certain preferred embodiments thereof, other embodiments are possible. For example, embodiments with more than three connectors and more than two strips are feasible for simultaneously securing together more than one pair of plugs, more than one group of cords or loops, or at least one pair of plugs and one group

of cords or loops. Therefore, the spirit and scope of the appended claims should not be limited to the description of the preferred embodiments contained herein.

I claim:

1. A securing device suitable for securing together a plurality of cords and for securing together a plurality of loops of one or more cords, comprising:

(a) a disk-shaped first connector disposed within a reference plane, the first connector comprising two adjoined layers and being substantially inflexible and substantially nonelastic, the connector defining:

- (i) a central opening; and
- (ii) an access notch capable of allowing a member disposed perpendicular to the reference plane to be inserted into the central opening;

(b) a first strip attached to the first connector, the first strip being substantially flexible and elastic; and

whereby a plurality of cords or cord loops can be secured by wrapping the securing device around the plurality of cords or cord loops and by thereafter attaching the first connector to the first strip by inserting a portion of the first strip into the central opening via the access notch, the first strip being retained within the first connector by the opposing teeth.

2. The securing device of claim 1, wherein the first strip comprises two lateral edges, each edge having a ridge thereon.

3. The securing device of claim 1, wherein the first strip is tapered centrally.

4. The securing device of claim 1, wherein the first strip has a thickness between about $\frac{1}{16}$ inch and about $\frac{1}{2}$ inch.

5. The securing device of claim 1, wherein the access notch includes a pair of opposing teeth disposed in close proximity within the reference plane.

6. A securing device suitable for securing together a first plug attached to a first cord with a second plug attached to a second cord, wherein the first cord and the second cord can be the same or different cords, comprising:

(a) a first strip having a first end and a second end, wherein the strip is substantially flexible and elastic; and

(b) a disk-shaped first connector attached to the first end of the strip and disposed within a first reference plane, the first connector being substantially inflexible and substantially nonelastic, the first connector defining:

- (i) a first central opening; and
- (ii) a first access notch which allows a member disposed perpendicular to the reference plane to be inserted into the first central opening;

(c) a disk-shaped second connector attached to the second end of the strip and disposed within a second reference plane, the second connector being substantially inflexible and substantially nonelastic, the second connector defining:

- (i) a second central opening; and
- (ii) a second access notch which allows a member disposed perpendicular to the second reference plane to be inserted into the second central opening;

wherein at least one of the first connector and the second connector comprises two adjoined layers; and

whereby the first and second plugs can be secured together by inserting the first cord into the first central opening via the first access notch, and by inserting the second cord into the second central opening via the second access notch, thereby placing inward axial tension on the plugs securing them together, the cords

attached to the plugs being retained within the respective connectors by the opposing teeth.

7. The securing device of claim 6, wherein the first strip comprises two lateral edges, each edge having a ridge thereon.

8. The securing device of claim 6, wherein at least one of the first strip is tapered centrally.

9. The securing device of claim 6 wherein the first strip has a thickness between about $\frac{1}{16}$ inch and about $\frac{1}{2}$ inch.

10. The securing device of claim 6, wherein the first strip has a thickness between about $\frac{1}{16}$ inch and about $\frac{1}{2}$ inch.

11. The securing device of claim 6, wherein at least one of the access notches includes a pair of opposing teeth disposed in close proximity within the reference plane.

12. A securing device suitable for securing together a first plug attached to a first cord with a second plug attached to a second cord, wherein the first cord and the second cord can be the same or different cords, comprising:

(a) a first strip having a first end and a second end, wherein the first strip is substantially flexible and elastic; and

(b) a second strip having a first end and a second end, wherein the second strip is substantially flexible and elastic; and

(c) a disk-shaped first connector attached to the first end of the first strip and disposed within a first reference plane, the first connector being substantially inflexible and substantially nonelastic, the first connector defining:

- (i) a first central opening; and
- (ii) a first access notch which allows a member disposed perpendicular to the reference plane to be inserted into the first central opening, the first access notch including a first pair of opposing teeth disposed in close proximity within the reference plane;

(d) a disk-shaped second connector attached to the second end of the first strip and the first end of the second strip and disposed within a second reference plane, the second connector being substantially inflexible and substantially nonelastic, the second connector defining:

- (i) a second central opening; and
- (ii) a second access notch which allows a member disposed perpendicular to the second reference plane to be inserted into the second central opening, the second access notch including a second pair of opposing teeth disposed in close proximity within the second reference plane;

(e) a disk-shaped third connector attached to the second end of the second strip and disposed within a third reference plane, the third connector being substantially inflexible and substantially nonelastic, the third connector defining:

- (i) a third central opening; and
- (ii) a third access notch which allows a member disposed perpendicular to the third reference plane to be inserted into the third central opening, the third access notch including a third pair of opposing teeth disposed in close proximity within the third reference plane;

whereby the first and second plugs can be secured together by inserting the first cord into the first central opening via the first access notch, inserting the second cord into the second central opening via the second access notch, and inserting the first cord into the third central opening via the third access notch, thereby placing inward axial tension on the plugs securing them

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together, the cords attached to the plugs being retained within the respective connectors by the opposing teeth.

13. The securing device of claim 12, wherein at least one of the first strip and the second strip comprises rubber.

14. The securing device of claim 12, wherein at least one of the first strip and the second strip comprises two lateral edges, each edge having a ridge thereon.

15. The securing device of claim 12, wherein at least one of the first strip and the second strip is tapered centrally.

16. The securing device of claim 12, wherein at least one of the first strip and the second strip has a thickness between about $\frac{1}{16}$ inch and about $\frac{1}{2}$ inch.

17. The securing device of claim 12, wherein the first and second strips, and the first, second and third connectors are water-resistant and nonconductive.

18. The securing device of claim 12, wherein the central opening of the first, second and third connectors have first opening, second opening and third opening cross-sectional areas respectfully, and the cord attached to the first plug and the cord attached to the second plug have first cord and second cord cross-sectional areas respectfully, and wherein the first opening and third opening cross-sectional areas are smaller than the first cord cross-sectional area prior to insertion of the first cord into the first central opening, and wherein the second opening cross-sectional area is smaller than the second cord cross-sectional area prior to insertion of the second cord into the second central opening.

19. The securing device of claim 12, wherein at least one of the first connector, the second connector and the third connector comprises two adjoined layers.

20. The securing device of claim 19, wherein one of the adjoined layers comprises nylon.

21. A securing device suitable for securing together a plurality of cords and for securing together a plurality of loops of one or more cords, comprising:

(a) a disk-shaped first connector disposed within a reference plane, the first connector comprises two adjoined layers and being substantially inflexible and substantially nonelastic, the connector defining:

(i) a central opening; and
(ii) an access notch capable of allowing a member disposed perpendicular to the reference plane to be inserted into the central opening;

(b) a first strip attached to the first connector, the first strip being substantially flexible and elastic and comprising two lateral edges, each edge having a ridge thereon; and whereby a plurality of cords or cord loops can be secured by wrapping the securing device around the plurality of

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cords or cord loops and by thereafter attaching the first connector to the first strip by inserting a portion of the first strip into the central opening via the access notch, the first strip being retained within the first connector by the opposing teeth,

22. A securing device suitable for securing together a first plug attached to a first cord with a second plug attached to a second cord, wherein the first cord and the second cord can be the same or different cords, comprising:

(a) a first strip having a first end and a second end, wherein the strip is substantially flexible and elastic, and comprises two lateral edges, each edge having a ridge thereon; and

(b) a disk-shaped first connector attached to the first end of the strip and disposed within a first reference plane, the first connector being substantially inflexible and substantially nonelastic, the first connector defining:

(i) a first central opening; and
(ii) a first access notch which allows a member disposed perpendicular to the reference plane to be inserted into the first central opening;

(c) a disk-shaped second connector attached to the second end of the strip and disposed within a second reference plane, the second connector being substantially inflexible and substantially nonelastic, the second connector defining:

(i) a second central opening; and
(ii) a second access notch which allows a member disposed perpendicular to the second reference plane to be inserted into the second central opening;

whereby the first and second plugs can be secured together by inserting the first cord into the first central opening via the first access notch, and by inserting the second cord into the second central opening via the second access notch, thereby placing inward axial tension on the plugs securing them together, the cords attached to the plugs being retained within the respective connectors by the opposing teeth.

23. The securing device of claim 22, wherein at least one of the first connector and the second connector comprises two adjoined layers.

24. The securing device of claim 22, wherein at least one of the access notches includes a pair of opposing teeth disposed in close proximity within the reference plane.

* * * * *

EXHIBIT D

United States Patent Number 5,547,390 to Laherty. This reference was originally entered in the record by Applicant in a list of references cited by Applicant in an Information Disclosure Statement (PTO-SB/08A form) on November 25, 2003.



US005547390A

United States Patent [19][11] **Patent Number:** **5,547,390****Laherty**[45] **Date of Patent:** **Aug. 20, 1996**[54] **ELECTRICAL PLUG SECURING DEVICE**[76] Inventor: **Mark E. Laherty**, P.O. Box 662, Ross,
Calif. 94957

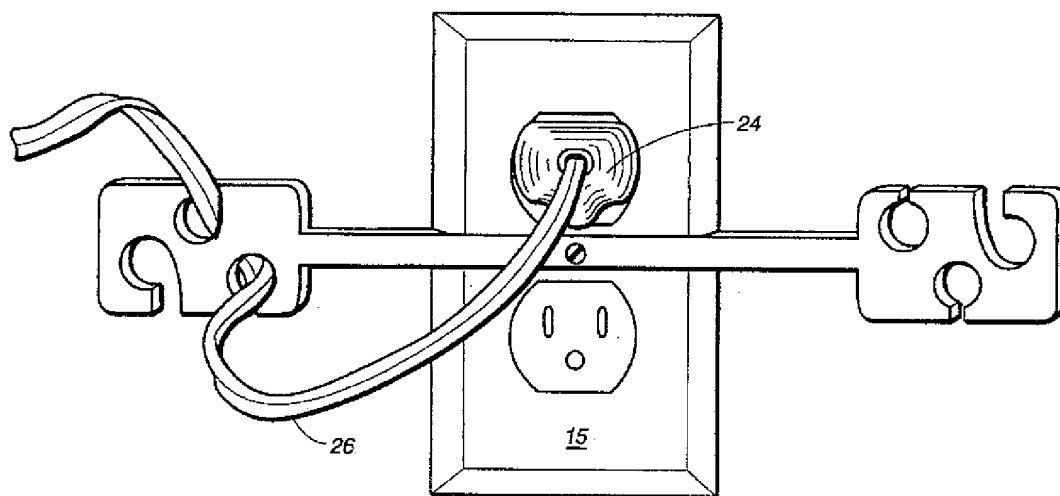
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5,044,976	9/1991	Thompson	439/373
5,174,293	12/1992	Hagiwarz	439/373
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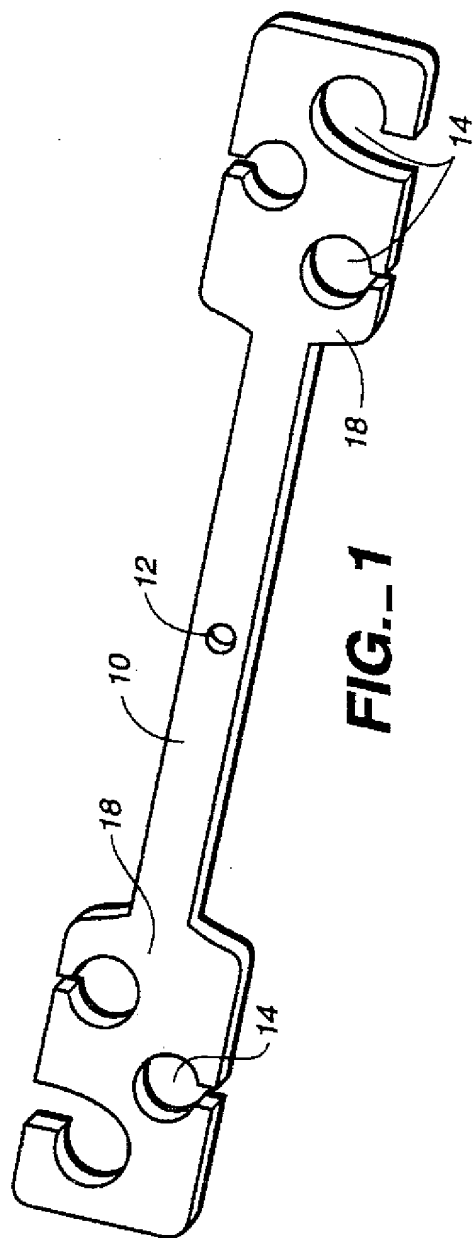
[21] Appl. No.: **375,386**[22] Filed: **Jan. 17, 1995**[51] Int. Cl.⁶ **H01R 13/62**[52] U.S. Cl. **439/373; 439/457; 439/458**[58] Field of Search **439/452, 456,**
439/457, 458, 371, 373*Primary Examiner*—David L. Pirlot*Assistant Examiner*—Yong Kim*Attorney, Agent, or Firm*—Larry D. Johnson[57] **ABSTRACT**

An electrical plug securing device provides a length of material and embodies appendages into which are formed slots. The device is attached to the faceplate of an electrical outlet using a machine screw and the screw hole already provided to affix the faceplate to the outlet. An electrical cord is then plugged into the outlet and the cord is wrapped around the device, going through the slots and being held there by friction. Thus, the plug is prevented from being removed from the outlet inadvertently.

[56] **References Cited****U.S. PATENT DOCUMENTS**

2,569,037	9/1951	Dalton	
2,728,058	12/1955	Phalen	439/373
3,163,481	12/1964	Salvador	439/373
3,708,778	1/1973	McKeever	439/371
3,775,729	11/1973	Casper	439/371
4,066,313	1/1978	von dem Hagen	439/371

4 Claims, 7 Drawing Sheets



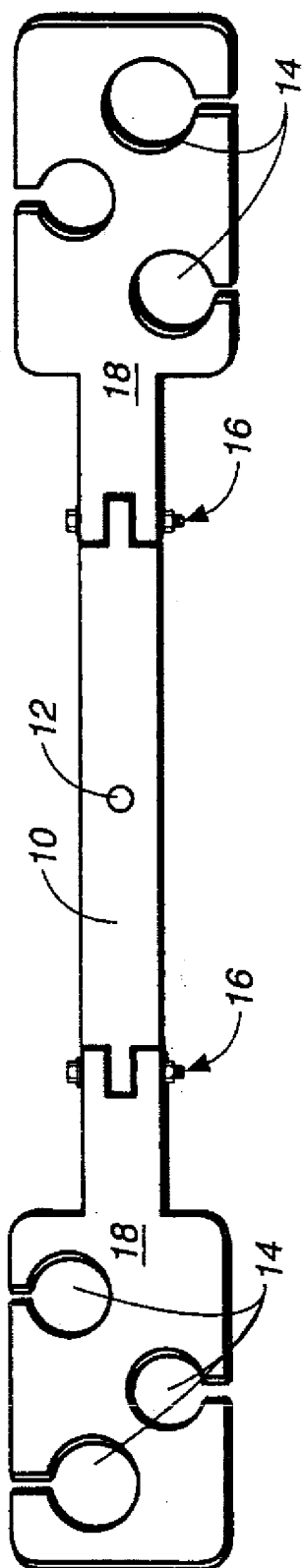


FIG. 3

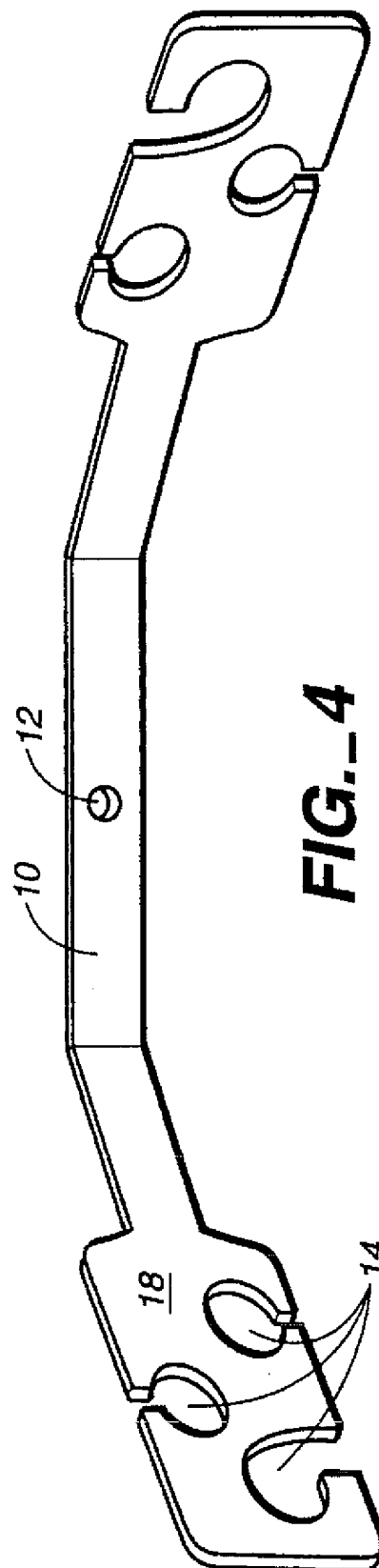


FIG. 4

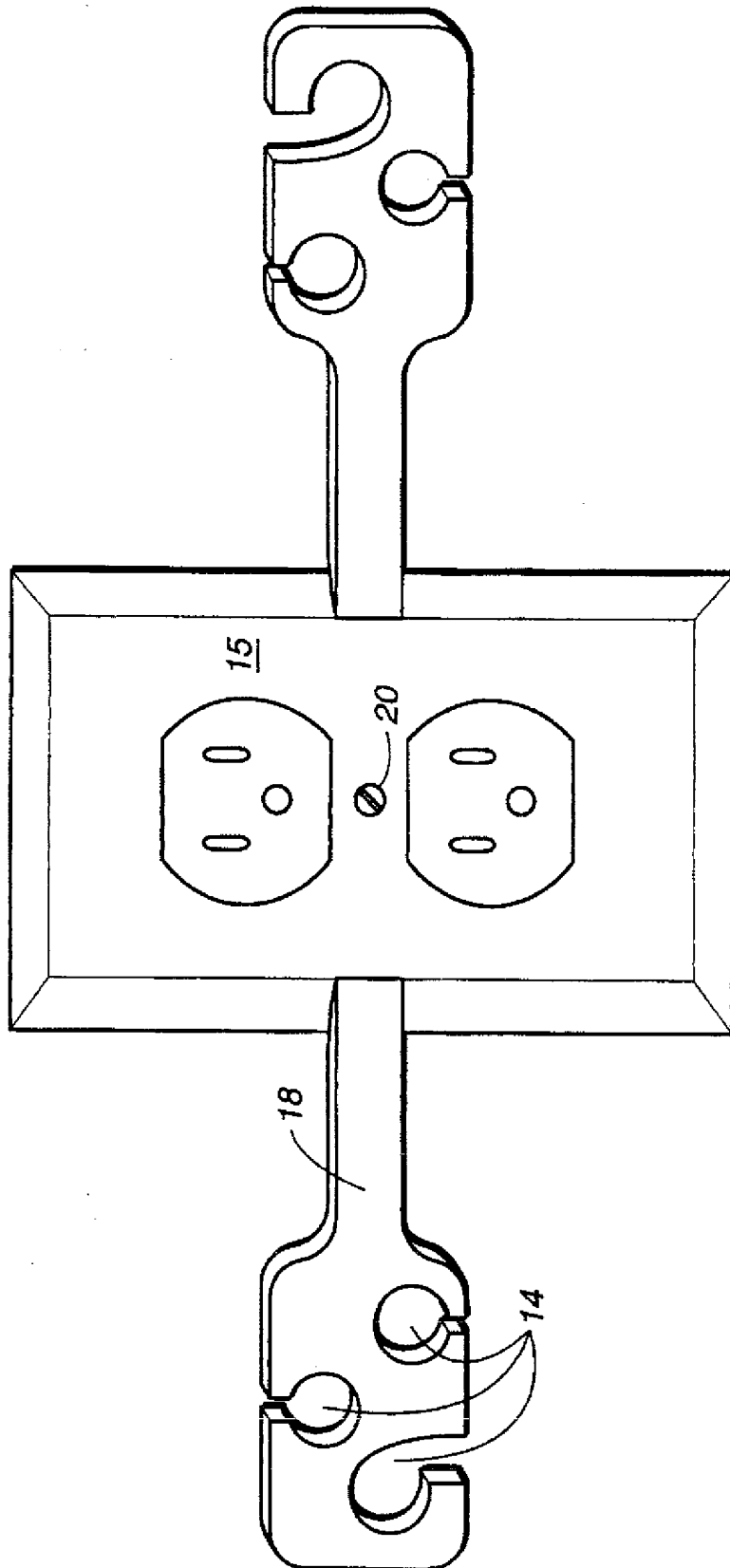


FIG. 5

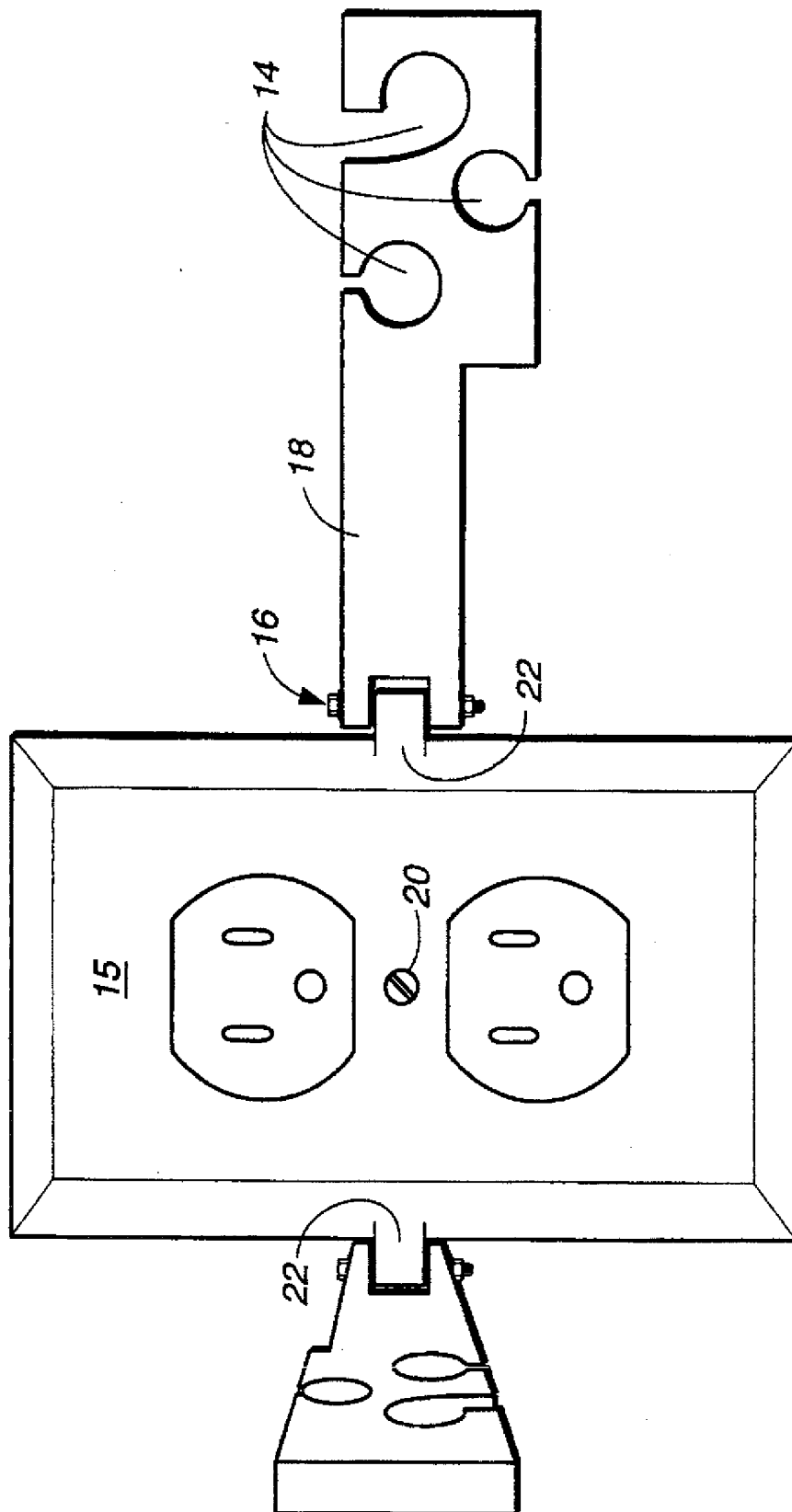
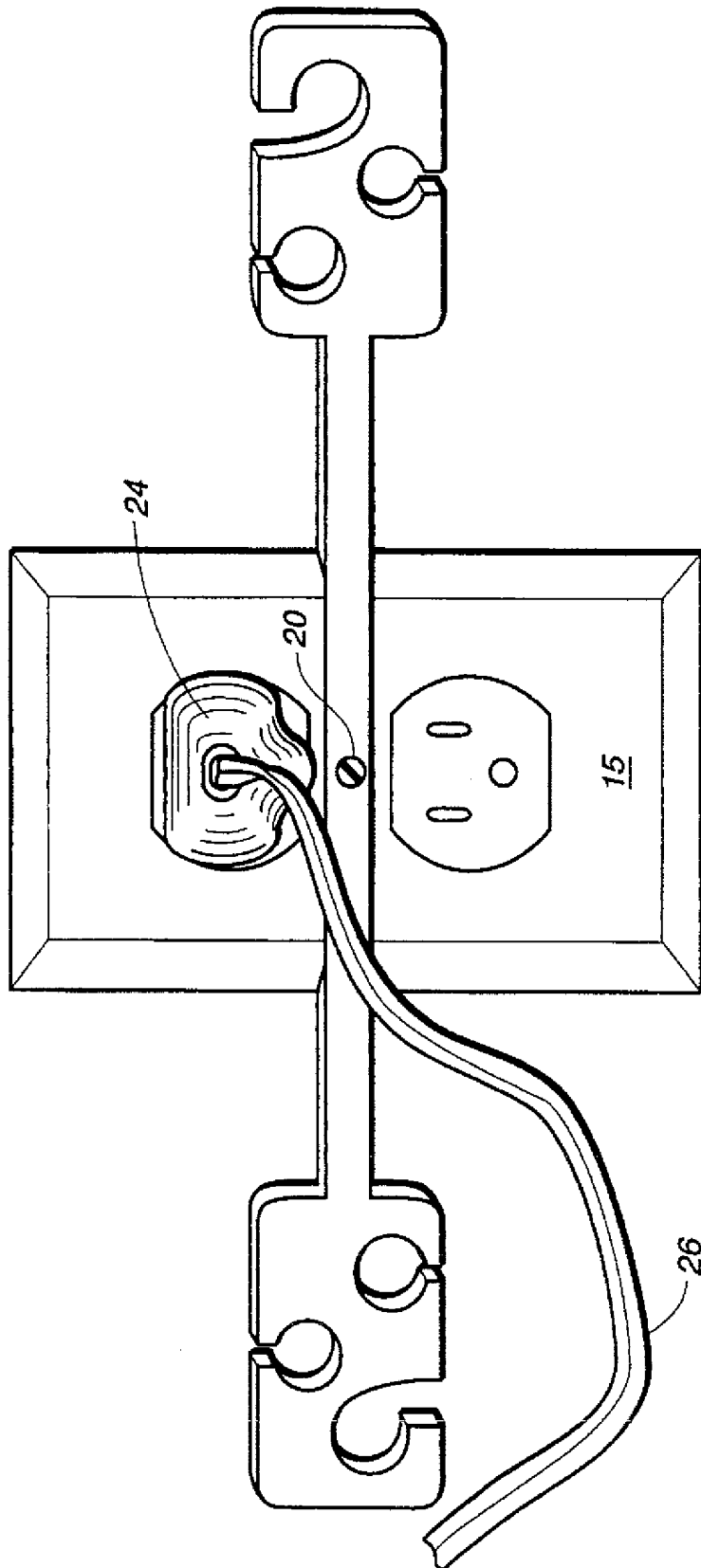


FIG. 6



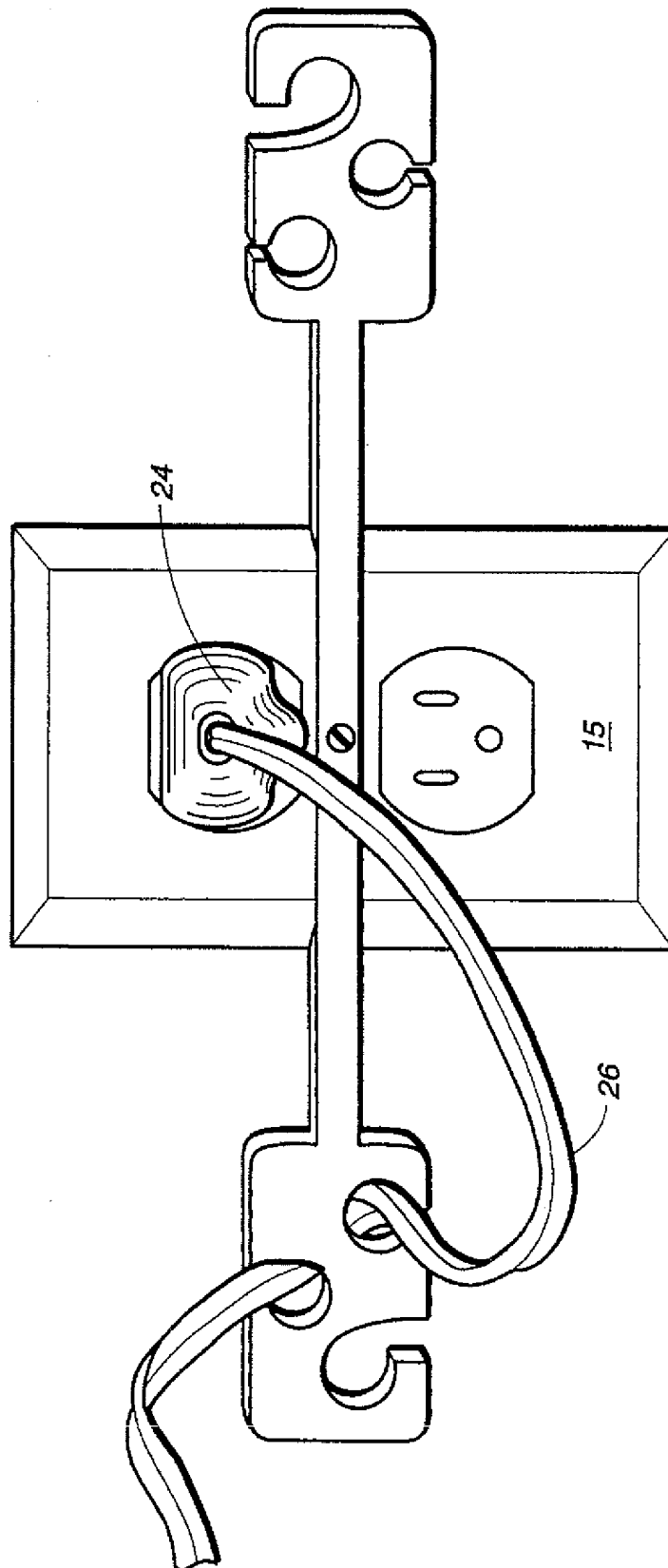


FIG. 8

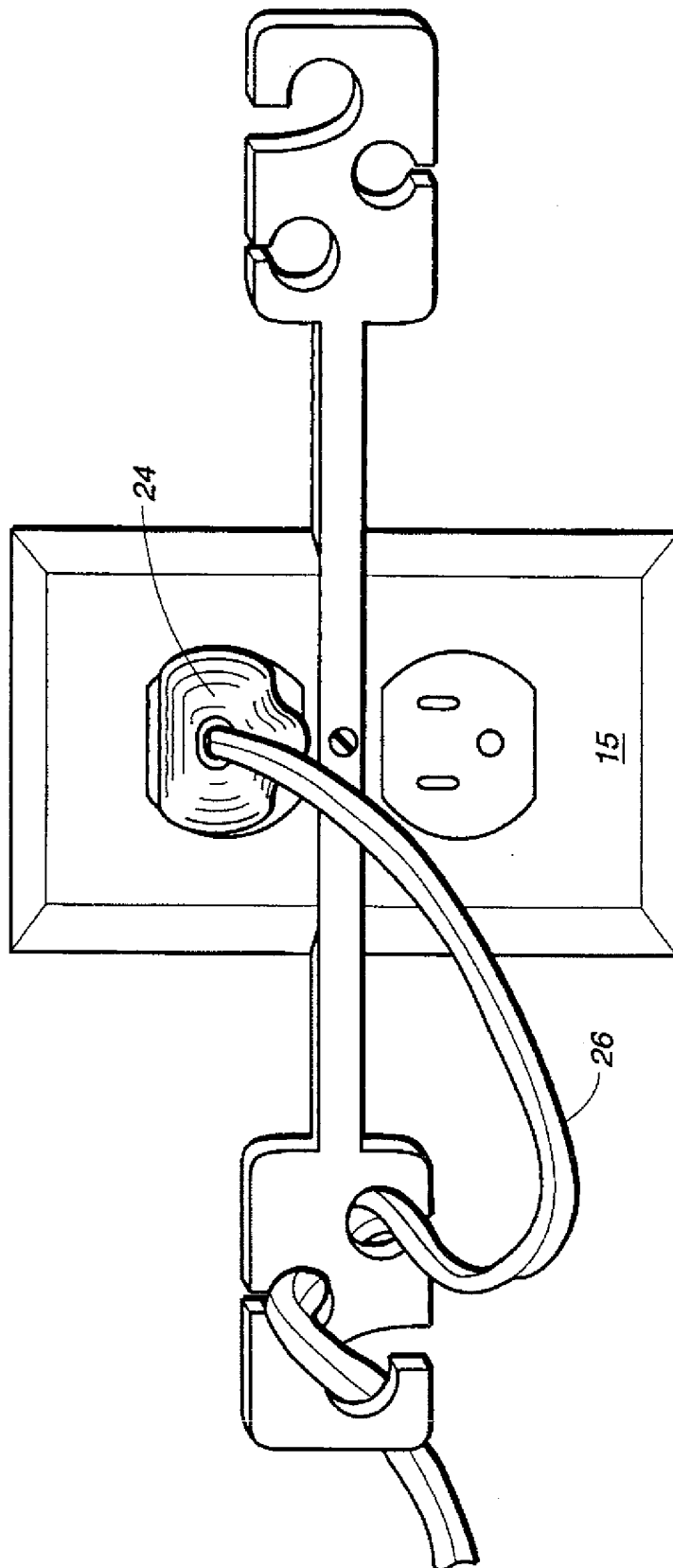


FIG. 9

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ELECTRICAL PLUG SECURING DEVICE**BACKGROUND OF THE INVENTION****1. Field of the Invention**

This invention relates generally to electrical cords and associated hardware, and more specifically to an improved device to prevent an electrical cord being accidentally or unintentionally pulled from an electrical outlet.

2. Description of the Prior Art

It is a common occurrence during the normal use of electrical tools, appliances, or other electrical implements that the electric cord supplying electricity becomes inadvertently removed from the electrical outlet. Most often this is merely an inconvenience, but it also can cause damage to the electric cord, and could even be an electrical hazard.

Various contrivances have been proposed to prevent the accidental or unintentional removal of plugs from outlets. These include devices disclosed in U.S. Pat. Nos. 2,569,037, 3,708,778, 3,775,729, 4,066,313, 4,566,185, 4,618,200 and 5,044,976. However, none of these known devices satisfactorily performs the desired objectives: the devices being too inconvenient to use quickly; or lacking simplicity of operation; or are physically obtrusive; or lacking ease of installation.

It is therefore an object of this invention to provide a means of preventing the plug of an electrical cord from being inadvertently removed from a common, household electrical outlet.

It is a further object of this invention to provide a device that can be attached easily and securely to the electrical outlet.

It is yet another object of this invention to provide an electrical plug securing device that is easy and simple to use.

Other objects and advantages of the invention will become apparent to those of ordinary skill and art as the description of the invention continues.

SUMMARY OF THE INVENTION

The electrical plug securing device of this invention provides a length of material and embodies appendages into which are formed slots. The inventive device is attached to the faceplate of an electrical outlet using a machine screw and the screw hole already provided to affix the faceplate to the outlet. An electrical cord is then plugged into the outlet and the cord is wrapped around the inventive device, going through the slots and being held there by friction. Thus, the plug is prevented from being removed from the outlet inadvertently.

In the preferred embodiment, the electrical cord securing device includes a length of material that is attached to a household electrical outlet in such a way that the device is in a plane parallel to the outlet faceplate and extends away from the outlet roughly perpendicular to a line that connects the two electrical receptacles. Connected to the length of material are appendages into which are formed slots. An electrical cord is then plugged into a receptacle and the electrical cord is wound around the appendages so as to course through the slots. When tension is then applied to the cord it is diverted to the outlet thus preventing the plug from being accidentally removed from the outlet.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of one embodiment of an electrical plug securing device of this invention, illustrating

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a solid strip of rigid or semi-rigid material with a hole in the center for attachment to a faceplate of an electrical outlet, and slots cut into the strip to accommodate an electrical cord;

FIGS. 2a and 2b show side views of the strip in FIG. 1; FIG. 3 shows the strip as in FIG. 1 with hinges added to relieve strain;

FIG. 4 is a perspective view of an alternate embodiment of the invention, illustrating a strip of rigid or semi-rigid material with slots as before but the strip projects out from the faceplate at an angle;

FIG. 5 is a perspective view of a further alternate embodiment of the invention, illustrating a common faceplate to an electrical outlet with integrally molded appendages projecting from the faceplate, with slots in the appendages to accommodate an electrical cord in the manner described herein;

FIG. 6 is a perspective view of a further alternate embodiment of the invention, illustrating the faceplate and common electrical outlet with hinges integrally molded to the faceplate so that appendages with slots can swing on the hinges, relieving strain and holding the electrical cord;

FIG. 7 is a perspective view of the embodiment of FIG. 1, with the inventive device attached to an outlet faceplate, with an electrical cord merely plugged into the outlet and not utilizing the inventive securing device;

FIG. 8 shows the electrical cord of FIG. 7 having been partially wound through the invention; and

FIG. 9 shows the electrical cord of FIG. 7 having been wound around the invention as in normal use.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

FIG. 1 shows the invention in the planar form consisting of a piece of rigid or semi-rigid material 10. In this material is a hole 12, through which a machine bolt fits for attachment to the outward face of a common, household electrical outlet. Integrally molded into material 10 are appendages 18 which are formed slots 14 through which the electrical cord will be placed, wrapping around the invention.

FIGS. 2a and 2b show the side views of the planar form of the invention and representations of slots 14.

FIG. 3 shows the material 10 that attaches to the faceplate by a machine screw that goes through hole 12. Appendage 18 is attached to 10 by inserting a pin 16 through complementary holes in 10 and 18 that form a hinge, thus allowing the appendage to rotate about the pin 16. Appendage 18 has slots 14 as before, through which to wind the electrical cord.

FIG. 4 shows the material 10 with hole 12 and slots 14 as in FIG. 1, but with the end sections (appendages) 18 bent at an angle to the section 10.

FIG. 5 shows the faceplate 15 of a common household electrical outlet that attaches to the outlet with machine screw 20. The faceplate has the appendages 18 integrally molded into the material of the faceplate and slots 14 in the appendages.

FIG. 6 shows a common household electrical outlet with the invention integrally molded into the faceplate of the outlet. The faceplate 15 is attached to the outlet by the machine screw 20 as in the normal manner. The faceplate has integrally molded extensions 22. The extensions 22 have holes through them and the appendages 18 have complementary holes through them so that when pin 16 is placed

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through both sets of holes a hinge is formed and appendage 18 can rotate about pin 16. Appendage 18 has slots 14 as before to accommodate the electrical cord.

FIG. 7 shows a common household electrical outlet with faceplate 15 and the invention attached by machine screw 20. An electrical plug 24 with electrical cord 26 is plugged into the outlet.

FIG. 8 shows the same view as FIG. 7, but with the electrical cord 26 passing through two of the slots in the invention.

FIG. 9 shows the same view as FIG. 8, but with the electrical cord 26 coursing through all three slots in the one side of the invention.

In operation, the user will attach the inventive device to the electrical outlet using the machine screw and hole for attachment of the faceplate. The user will then plug an electrical cord into the outlet and wrap the electrical cord around the invention in a helical fashion causing the cord to course through the slots in the material. The cord is held by friction in the invention and when tension is put on the cord that would normally pull the plug from the outlet the tension is diverted by the invention from the plug to the outlet which is attached to a wall. Thus the plug is prevented from being pulled from the outlet.

While this invention has been described in connection with preferred embodiments thereof, it is obvious that modifications and changes therein may be made by those skilled

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in the art to which it pertains without departing from the spirit and scope of the invention. Accordingly, the scope of this invention is to be limited only by the appended claims and their equivalents.

What is claimed as invention is:

1. A device to prevent the accidental or unintentional removal of an electrical cord plug from a common, household electrical outlet, said device comprising:

a strip of material attached to said electrical outlet;
at least one appendage integrally attached to said strip;
and

slots formed in said appendage such that an electrical cord, when wrapped around said appendage, may course through said slots in a manner that will inhibit movement of said cord, by friction, when tension is applied to said cord.

2. The device of claim 1 wherein said appendage is connected to said strip by a hinge.

3. The device of claim 1 wherein said strip of material is integrally molded into said faceplate of said electrical outlet.

4. The device of claim 3 wherein said appendage is connected to said strip by a hinge.

* * * * *

EXHIBIT E

United States Patent Number 6,033,251 to Cook. This reference was originally entered in the record by the Examiner in a list of references cited by the Examiner (PTO-892 form) on November 29, 2004, accompanying a final Office Action.



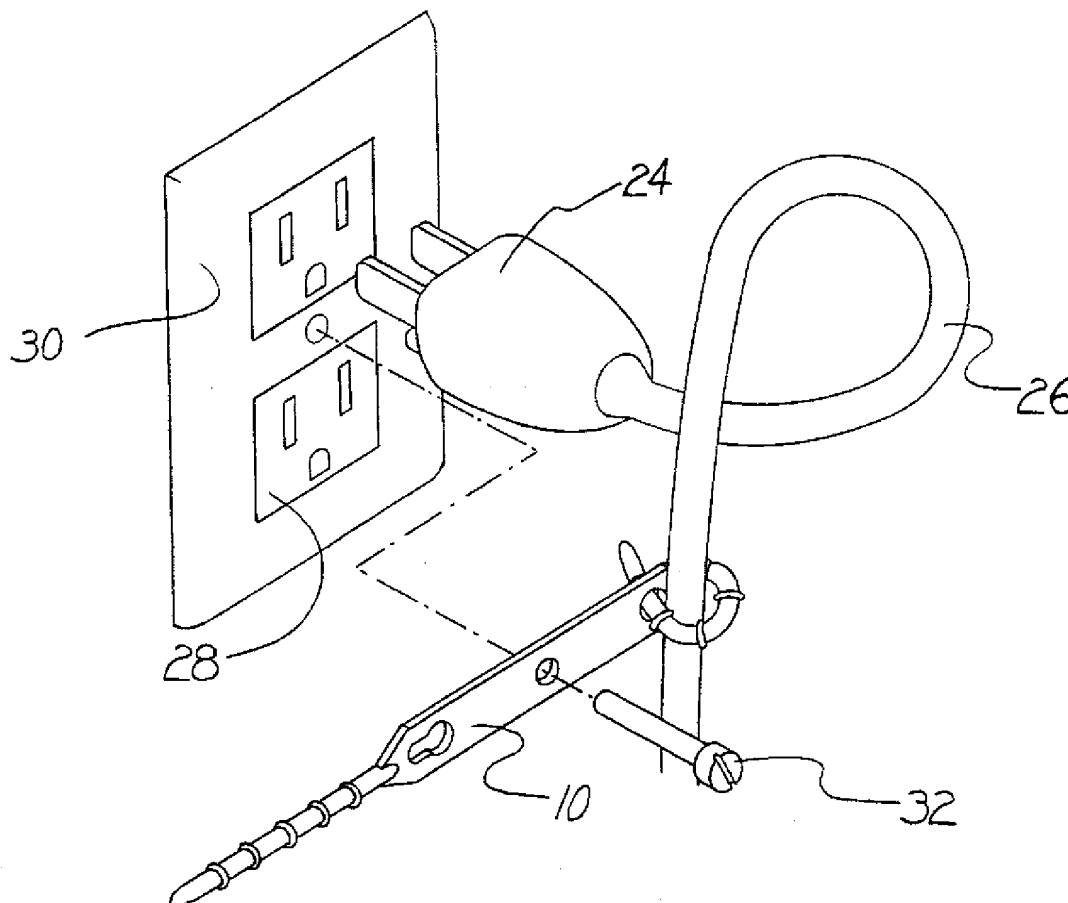
US006033251A

United States Patent [19][11] **Patent Number:** 6,033,251**Cook**[45] **Date of Patent:** Mar. 7, 2000[54] **EXTENSION CORD LOCKING DEVICE**[76] **Inventor:** James E. Cook, 4979 Charles Samuel Dr., Tallahassee, Fla. 32308*Primary Examiner*—Neil Abrams*Assistant Examiner*—Eugene G. Byrd*Attorney, Agent, or Firm*—John Wiley Horton[21] **Appl. No.:** 09/084,609[22] **Filed:** May 26, 1998[51] **Int. Cl.⁷** H01R 13/625[52] **U.S. Cl.** 439/369; 439/371[58] **Field of Search** 439/369, 367,
439/368, 370, 371[56] **References Cited****U.S. PATENT DOCUMENTS**

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[57] **ABSTRACT**

A device capable of securing an extension cord to an electrical outlet, of securing two extension cords together, and of securing an extension cord to the power cord of a power tool. The device has a central portion with a hole sized to accommodate the cover plate screw found on standard electrical outlets, so that the cover plate screw may be used to secure the device to the outlet. The device also has two flexible prongs on either end which are designed to wrap around and grip an extension cord, so that one or two extension cords may be secured to the device.

7 Claims, 4 Drawing Sheets

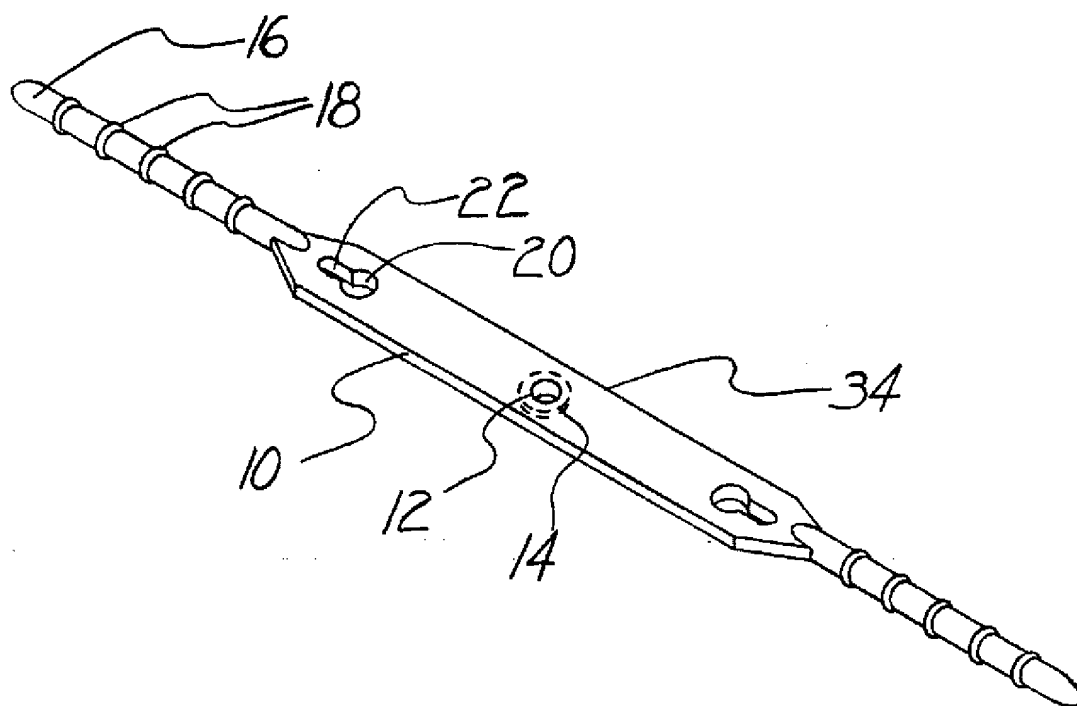
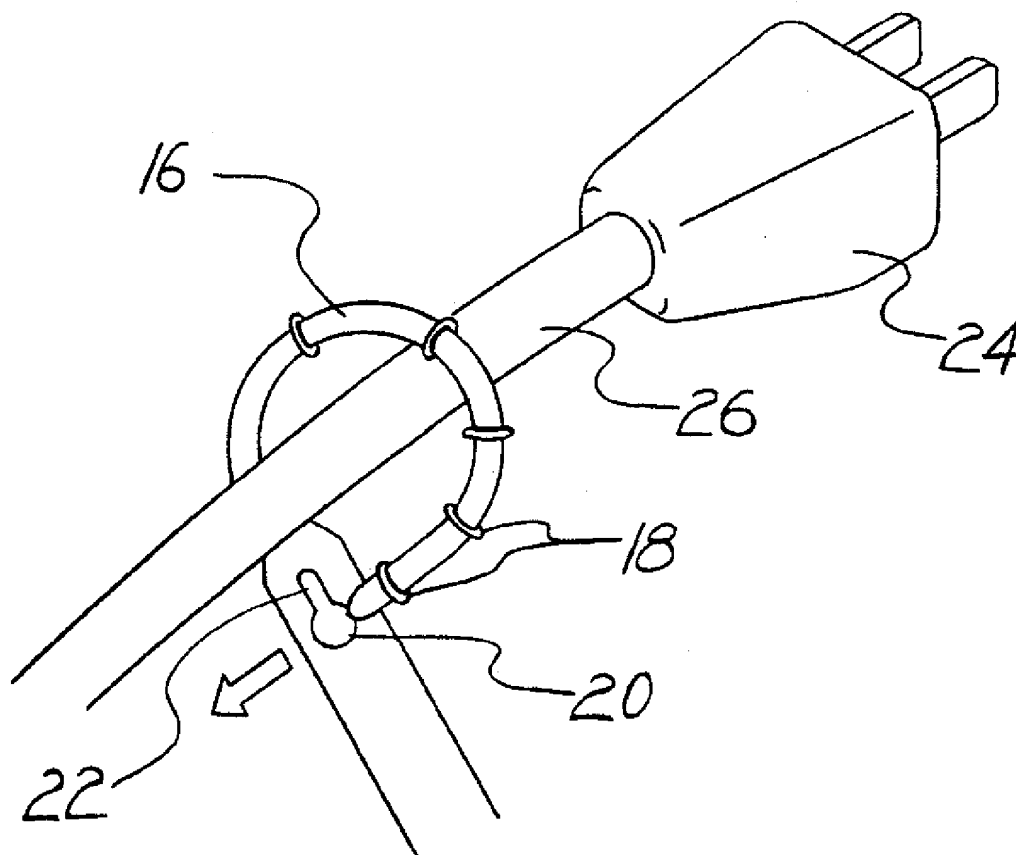


FIG. 1

**FIG. 2**

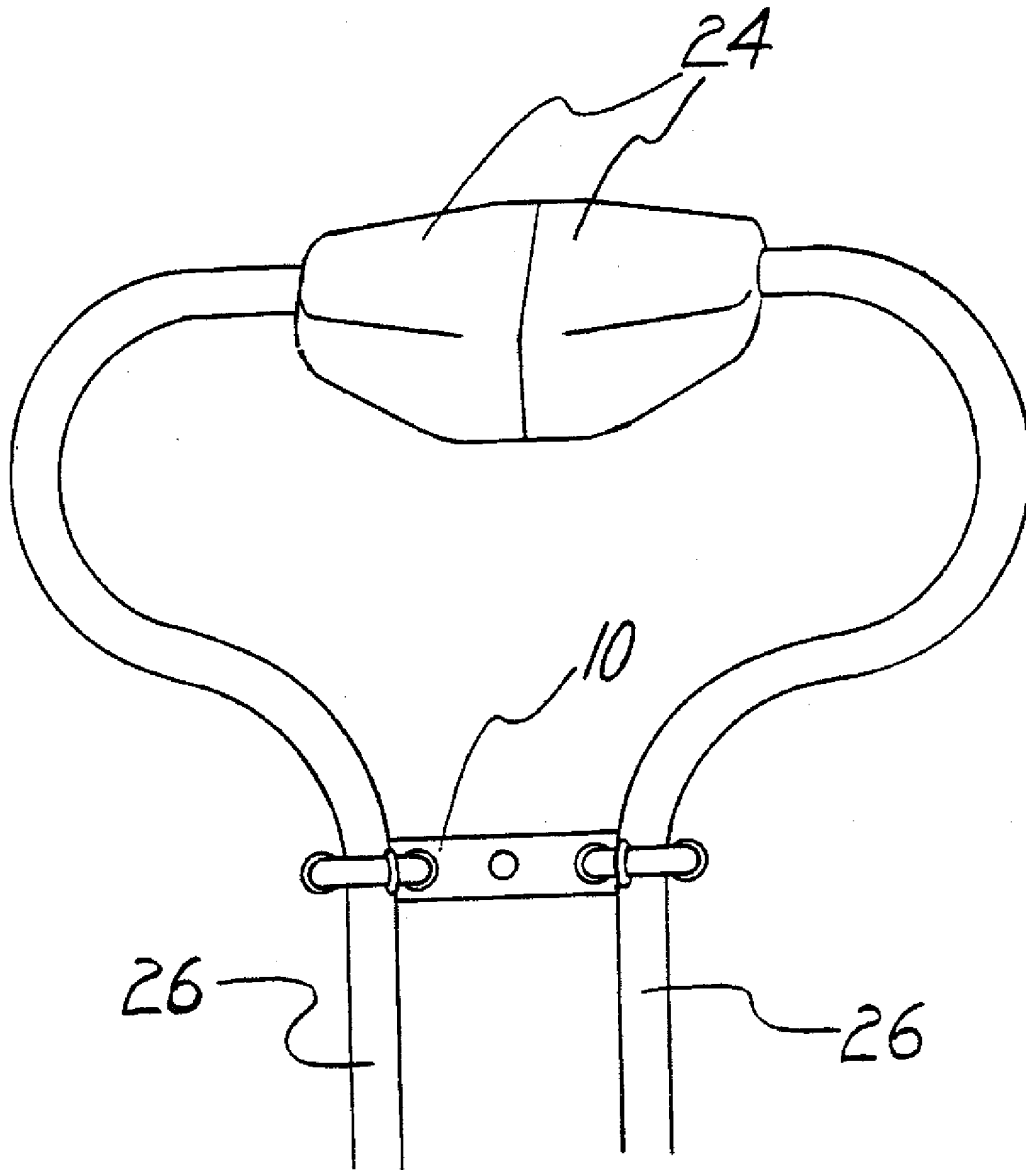


FIG. 3

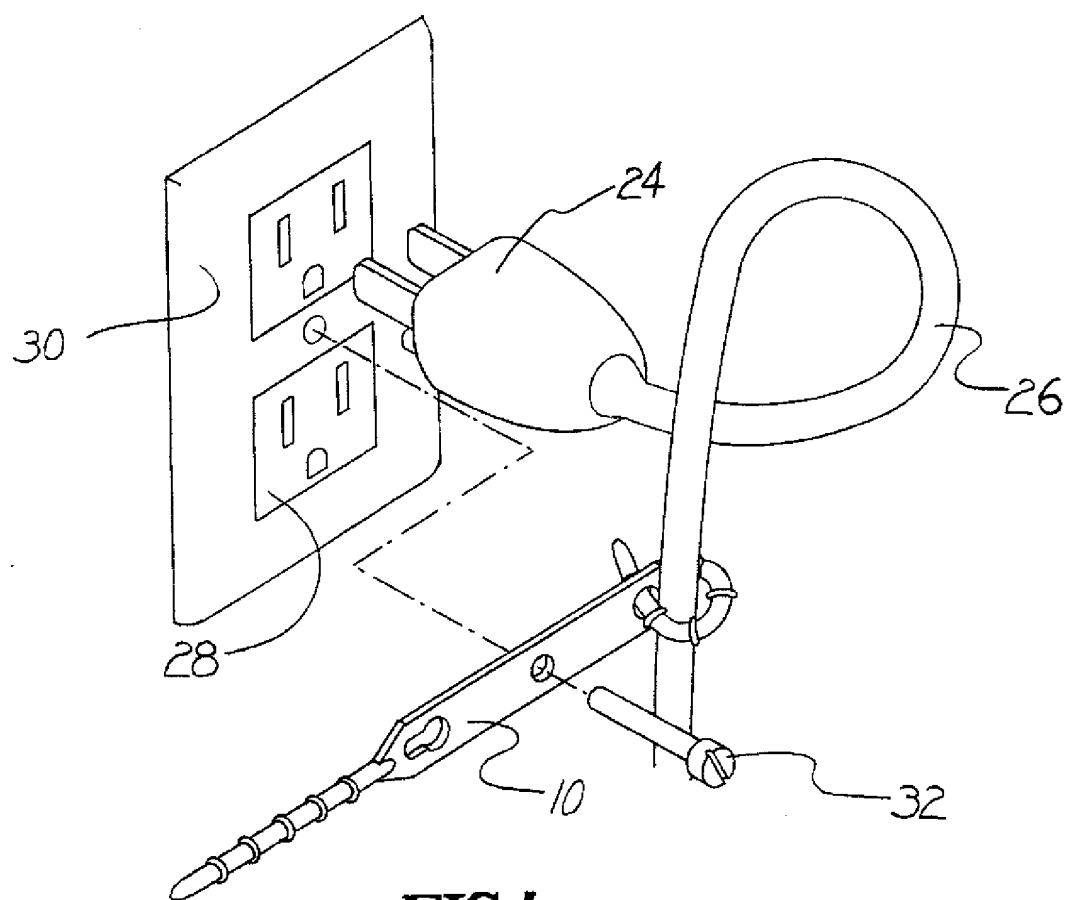


FIG. 4

EXTENSION CORD LOCKING DEVICE

BACKGROUND—FIELD OF INVENTION

This invention relates to electrical extension cords, and specifically to a device for securing two cords together and for securing one end of a cord to a wall outlet.

BACKGROUND—DESCRIPTION OF PRIOR ART

Extension cords are commonly used to provide electrical power to portable tools. As the portable tool gets further away from the outlet, a series of mated extension cords are typically employed. By the very nature of this use, the cords are often dragged around and placed under considerable tension, resulting in a disconnection between the last cord and the portable device, a disconnection between two of the cords, or a disconnection between the first cord and the electrical outlet.

Many proposed inventions have attempted to eliminate this recognized problem. U.S. Pat. No. 4,643,505 to House (1987) employs a split housing with movable washers to engage and hold the mated plugs of two extension cords together. Similar configurations are found in U.S. Pat. No. 5,129,839 to VanSkiver (1992) and in U.S. Pat. No. 4,169,643 to Gallagher (1979). All three devices are relatively large, resulting in an impediment to motion when the cord is passed around corners and other obstacles in the workplace. The devices are also made from several complex pieces, requiring multiple molds for manufacturing. While they hold the cords securely, they do so by gripping the plugs, introducing a risk that the cord may be pulled free of its plug. Additionally, all three devices are difficult to remove and cumbersome if left attached to the cord.

The device shown in U.S. Pat. No. 4,221,449 to Shugart (1980) eliminates the housing, but it still has two complex molded pieces. It is also possible for the cord to slip free of the movable locking members shown. Like the '505, '839, and '643 devices, it secures the cords by gripping the plugs, again introducing the risk of pulling the cord free from its plug.

U.S. Pat. No. 4,884,979 to Budner (1989) secures the cords by gripping the cord itself, eliminating the concern discussed above. However, the Budner device employs seven separate pieces, is quite large, and would be fairly expensive to manufacture. U.S. Pat. No. 4,206,961 to Cifalde (1980) achieves the same gripping method through the use of a coiled steel wire. While simple, the Cifalde device is bulky, and liable to be snagged on obstacles as the cord is dragged around. Also, because the steel wire employed is conductive, there is a risk of electrocution if the gripping portion abrades away the cord insulation and comes in contact with the conductors.

A more compact device is shown in U.S. Pat. No. 5,179,044 to Muromachi (1993). The Muromachi device employs a pliable rubber member in conjunction with a nylon wire tie and metal hook to fasten two plugs together. The device holds the plugs firmly and is streamlined to prevent snagging of the cord. Unfortunately, like the '505, '839, and '643 devices, it grips the plugs and not the cords. Like the Budner invention, it also uses a conductive wire for one of the grips, introducing the same electrocution hazard. Additionally, it requires three or more separate pieces, all of which have to be manipulated into position, making the device cumbersome to install and remove.

A simpler device is shown in U.S. Pat. No. 4,514,026 to Herbert (1985). The Herbert device uses a long flat member to wrap around the plugs in a crisscross fashion. One end of the device is secured to the first plug by a male pin being placed through a hole. The unsecured end is then wrapped around the second plug and secured by placing a second male pin through a second hole. The invention is simple, and is streamlined sufficiently not to snag on obstacles. However, the device once again grips the plugs and not the cord. Additionally, it requires the user to align and mate two very small pins while holding the device in the correct position. It is therefore fairly difficult to install. And, while it is effective in joining two cords together, it has no provision for securing the first cord to an electrical outlet. In fact, none of the devices reviewed incorporate any provision for securing the cord to an electrical outlet. Furthermore, the user often wishes to temporarily disconnect the cords, such as when an adjustment is made to a dangerous tool like a circular saw. The '026 and '044 devices do not allow the plugs to be disconnected without removing the securing device.

The known methods for securing extension cord connections are therefore limited in that they: (1) Grip the plugs and not the cords; (2) Are bulky and prone to snagging as the cords are dragged about; (3) Introduce a threat of electrocution; (4) Are complex; (5) Are expensive to manufacture; (6) Do not allow the plugs to be disconnected with the securing means attached; and (7) Cannot be used to secure an extension cord to an electrical outlet.

OBJECTS AND ADVANTAGES

Accordingly, several objects and advantages of the present invention are:

- (1) to join two extension cords by gripping the cords and not the plugs;
- (2) to join two extension cords using a compact device that will not snag as the cords are dragged around obstacles;
- (3) to avoid the use of any electrically conductive material;
- (4) to employ a very simple one-piece device;
- (5) to ensure that the device is very cheap to manufacture;
- (6) to allow the cords to be disconnected without removing the device; and
- (7) to provide for the attachment of an extension cord to an electrical outlet.

These objects will be fully explained in the details hereafter described, explained, and claimed, with reference being made to the accompanying drawings.

DRAWING FIGURES

FIG. 1 is an isometric view, showing the proposed invention.

FIG. 2 is an isometric view, showing how the proposed invention attaches to an extension cord.

FIG. 3 is an isometric view, showing how the proposed invention joins two extension cords and prevents separation.

FIG. 4 is an isometric view, showing how the proposed invention attaches an extension cord to an electrical outlet.

REFERENCE NUMERALS IN DRAWINGS

10 cord connector
12 center hole
14 washer
16 flexible prong
18 toggle ring
20 toggle hole
22 key way
24 plug
26 extension cord
28 electrical outlet
30 cover plate
32 cover plate screw
34 central portion

Description—FIG. 1

A typical embodiment of the present invention is illustrated in FIG. 1. Cord connector 10 is injection molded as one integral piece from suitable plastic, such as polypropylene. While the specific material selected is unimportant, it must be sufficiently flexible to allow the device to bend around an extension cord, as will be described in the "Operation" section. It is also important that the material selected be elastic, so that it tends to return to the flat state shown in FIG. 1.

Central portion 34 has center hole 12 at the middle. Washer 14 is molded integral with cord connector 10, and is completely embedded therein. The through-bore of washer 14 is aligned with center hole 12 as shown. Two flexible prongs 16 are located on either end of central portion 34. Each flexible prong 16 has a plurality of toggle rings 18 distributed evenly along its length.

Two toggle holes 20 are located in central portion 34, immediately adjacent the two flexible prongs 16. Two keyways 22 are cut into the sides of toggle holes 20 as shown. Operation—FIGS. 2 to 4

The operation of the proposed invention will be explained with reference to FIG. 2. The user first places cord connector 10 against extension cord 26. Next, the user bends flexible prong 16 around extension cord 26. Then, the user pushes the tip of flexible prong 16 through toggle hole 20, in the direction indicated by the arrow. The user continues pushing flexible prong 16 through toggle hole 20, advancing the succession of toggle rings 18 through toggle hole 20, until flexible prong 16 is wrapped tightly around extension cord 26 and can go no further. The user then releases cord connector 10. Flexible prong 16, being molded of a resilient material, tends to straighten itself back out. As it begins to straighten, one of the toggle rings 18 will engage the edge of toggle hole 20, preventing flexible prong 16 from sliding back out of toggle hole 20. Cord connector 10 is thereby secured to extension cord 26.

If tension is placed on central section 34 of cord connector 10, it may cause toggle rings 18 to become disengaged from toggle hole 20. Keyway 22 is provided to address this concern. As tension is placed on central section 34, keyway 22 slides over flexible prong 16. Keyway 22 is just wide enough to accommodate central prong 16, but it is too narrow to allow the passage of toggle rings 18. Keyway 22 thereby securely locks flexible prong 16 in place whenever tension is placed on cord connector 10.

At this point in the operation, one end of cord connector 10 is secured to extension cord 26, and the other end is free. The user then places a second extension cord next to the free end, and repeats the previous operations in order to secure the free end of cord connector 10 to the second extension cord. Turning to FIG. 3, the two extension cords are then

plugged into each other in the conventional fashion. Cord connector 10 is at this point is secured to both extension cords, as shown. As tension is placed on the two mated extension cords, cord connector 10 acts as a strain relief, transmitting the tension from one cord to the other, without transmitting any tension through the plugs themselves. Tension may thereby be transmitted from one cord to the next without the two plugs disengaging.

However, as cord tension is transmitted from cord to cord, the tension must ultimately be transmitted to the connection between the first plug and the wall socket. It therefore does very little good to prevent the chain of extension cords from disconnecting, if the entire chain is easily disconnected from the wall. Accordingly, the proposed invention also contains features intended to secure the first extension cord to the wall outlet. These features will be explained with reference to FIG. 4.

Electrical outlet 28 is a conventional two plug type. It is covered by cover plate 30, which is held in place by cover plate screw 32. While electrical outlet 28 is shown as a two-plug type, it could be a four plug type, an outdoor type, etc. All these types of plugs have a standard cover plate screw 32, and the proposed invention would operate in the same fashion.

To begin with, the user secures cord connector 10 to extension cord 26 using the same procedure as described previously. Next, the user takes a screwdriver and removes cover plate screw 32. The user then places cover plate screw 32 through center hole 12 in cord connector 10. Cover plate screw 32 is next threaded back into electrical outlet 28 and used to pull central portion 34 of cord connector 10 up against cover plate 30. The user then plugs plug 24 into electrical outlet 28. As tension is placed on extension cord 26, the tension is transmitted from the cord, through cord connector 10, and directly to electrical outlet 28. Since extension cord 26 is mechanically secured, the tension will not disengage plug 24.

The tension transmitted by this method has a tendency to stretch and distort center hole 12. Washer 14 is provided to more evenly distribute the load through central portion 34. As explained previously, washer 14 is molded within the resilient material of cord connector 10, having its central through-bore aligned with center hole 12.

The reader, upon reviewing FIG. 4, will appreciate that the second flexible prong 16 of cord connector 10 remains free for attachment to a second extension cord. Cord connector 10 is designed to secure two extension cords to electrical outlet 28. For purposes of clear illustration, the device is shown attached to only one cord.

Summary, Ramifications, and Scope

The proposed invention therefore has significant advantages over the prior art in that it: (1) joins two extension cords by grabbing the cords and not the plugs; (2) will not snag as the cords are dragged around obstacles; (3) avoids the use of any electrically conductive material in the gripping portions; (4) employs a very simple one-piece device; (5) ensures that the device is very cheap to manufacture; and (6) secures the first plug of an extension cord to an electrical outlet.

The reader will appreciate that many changes could be made to the device described without altering the fundamental nature of the invention. For example, the reinforcing washer could be omitted, the shape of the toggle rings could be altered, a different material could be used, etc. Accordingly, the scope of patent protection should be governed by the following claims, with consideration being given to the preceding detailed descriptions as well.

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Having described my invention, I claim:

1. A device for securing an extension cord to an electrical outlet using the standard cover plate screw used to attach the cover plate to said outlet, comprising:

- a. an elongated member having a central portion and an end portion, wherein said central portion opens into a hole passing completely through said central portion, with said hole being sized to accommodate said standard cover plate screw for purposes of securing said elongated member to said electrical outlet, with said central portion being sufficiently thin to allow its attachment using said standard cover plate screw, and
- b. means for securing said end portion of said elongated member to an extension cord.

2. A device as in claim 1, wherein said means for securing said elongated member to an extension cord comprises:

- a. said end portion is formed in the shape of a flexible prong having a plurality of toggle rings distributed along its length, and
- b. said central portion opens into a second hole passing completely through said central portion, with said second hole being located proximate the point of transition between said central portion and said end portion, and said second hole being sized to allow the passage of said toggle rings on said flexible prong, so that said flexible prong may be bent around an extension cord and thrust through said second hole.

3. A device as in claim 1, wherein said elongated member has a second end portion, said second end portion having means for attaching said second end portion to a second extension cord.

4. A device as in claim 3, wherein said means for securing said elongated member to said second extension cord comprises:

- a. said second end portion is formed in the shape of a second flexible prong having a plurality of toggle rings distributed along its length, and
- b. said central portion opens into a third hole passing completely through said central portion, with said third hole being located proximate the point of transition between said central portion and said second end portion, and said third hole being sized to allow the passage of said toggle rings on said second flexible prong, so that said second flexible prong may be bent around an extension cord and thrust through said third hole.

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5. A device for securing two extension cords together comprising:

- a. an elongated member having a central portion, a first end portion, and a second end portion, wherein said central portion opens into a hole passing completely through said central portion, with said hole being sized to accommodate a cover plate screw for purposes of securing said elongated member to an electrical outlet;
- b. means for securing said first end portion of said elongated member to a first extension cord; and
- c. means for securing said second end portion of said elongated member to a second extension cord.

6. A device as in claim 5, wherein said means for securing said first end portion to said first extension cord comprises:

- a. said first end portion is formed in the shape of a first flexible prong having a plurality of toggle rings distributed along its length, and
- b. said central portion opens into a second hole passing completely through said central portion, with said second hole being located proximate the point of transition between said central portion and said first end portion, with said second hole being sized to allow the passage of said toggle rings on said first flexible prong, so that said first flexible prong may be bent around said first extension cord and thrust through said second hole.

7. A device as in claim 5, wherein said means for securing said second end portion to said second extension cord comprises:

- a. said second end portion is formed in the shape of a second flexible prong having a plurality of toggle rings distributed along its length, and
- b. said central portion opens into a third hole passing completely through said central portion, with said third hole being located proximate the point of transition between said central portion and said second end portion, with said third hole being sized to allow the passage of said toggle rings on said second flexible prong, so that said second flexible prong may be bent around said second extension cord and thrust through said third hole.

* * * * *

EXHIBIT F

United States Patent Number 5,211,573 to Cross. This reference was originally entered in the record by the Examiner in a list of references cited by the Examiner (PTO-892 form) on May 24, 2004, accompanying a non-final Office Action.



US005211573A

United States Patent [19][11] **Patent Number:** **5,211,573****Cross**[45] **Date of Patent:** **May 18, 1993**[54] **ELECTRICAL CORD COUPLING**[76] **Inventor:** Andrew L. Cross, 17774 Ravenna Rd., Mantua, Ohio 44255[21] **Appl. No.:** 895,135[22] **Filed:** Jun. 8, 1992

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Related U.S. Application Data

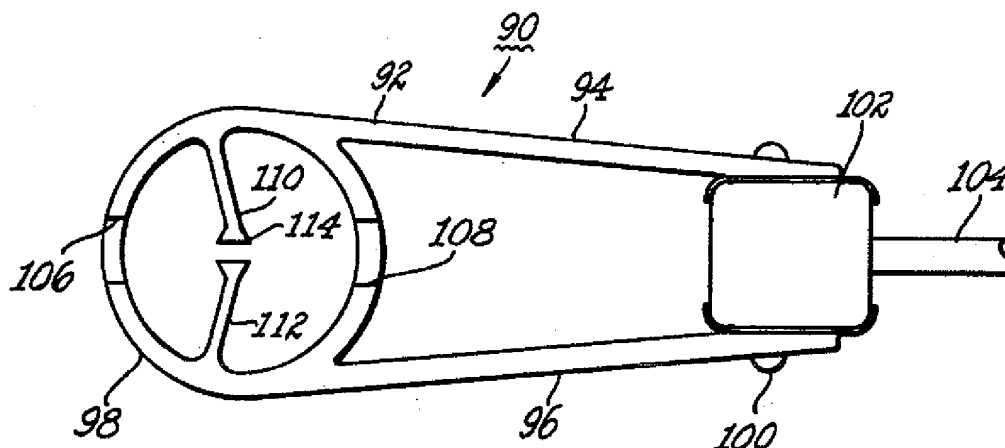
[63] Continuation-in-part of Ser. No. 815,750, Jan. 2, 1992.

[51] **Int. Cl.:** H01R 13/62[52] **U.S. Cl.:** 439/369; 439/373[58] **Field of Search:** 439/345, 367, 368, 369, 439/370, 371, 373[56] **References Cited****U.S. PATENT DOCUMENTS**

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Primary Examiner—Larry I. Schwartz**Assistant Examiner**—Khiem Nguyen**Attorney, Agent, or Firm**—John F. McDevitt[57] **ABSTRACT**

A method and means are provided to retain locked engagement for the plug end of an electrical cord. A coupling device is provided enabling the user to retain locking engagement for the electrically connected cord during ordinary usage.

15 Claims, 3 Drawing Sheets

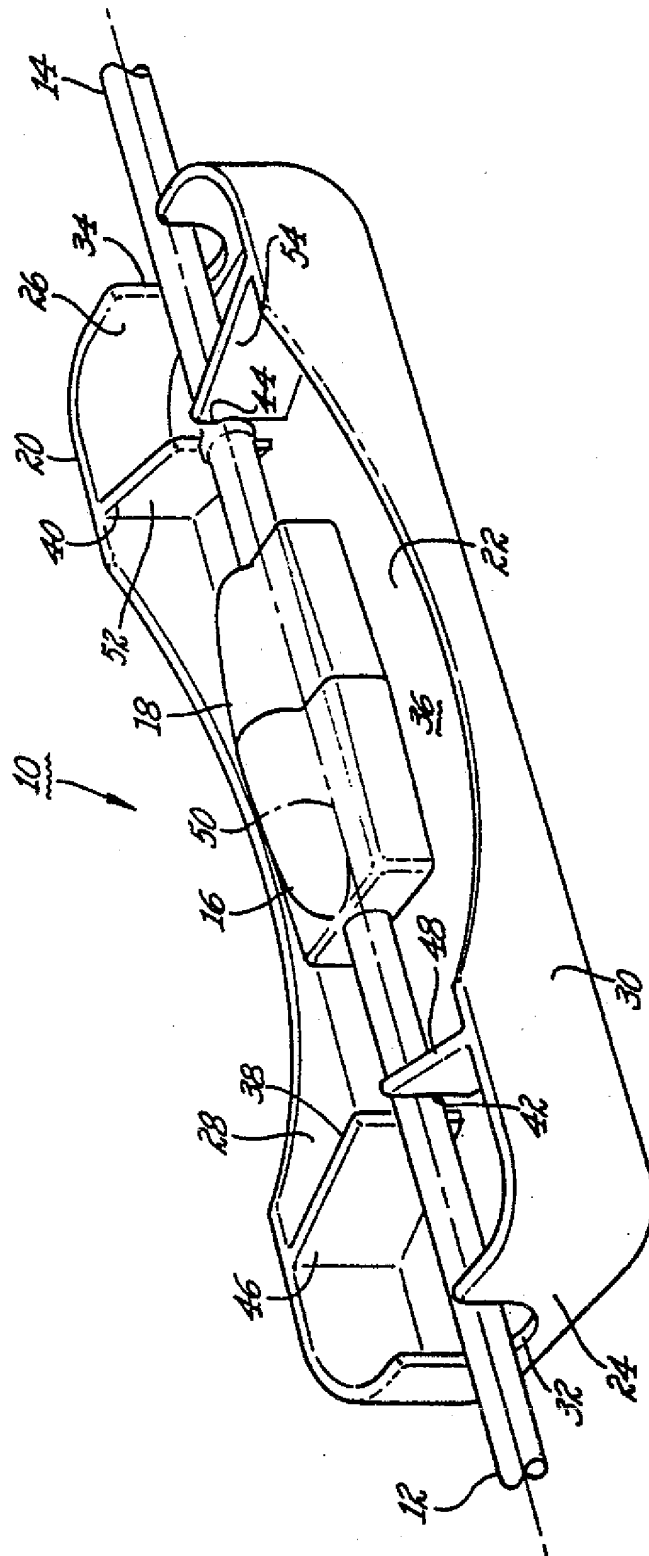


Fig. 1

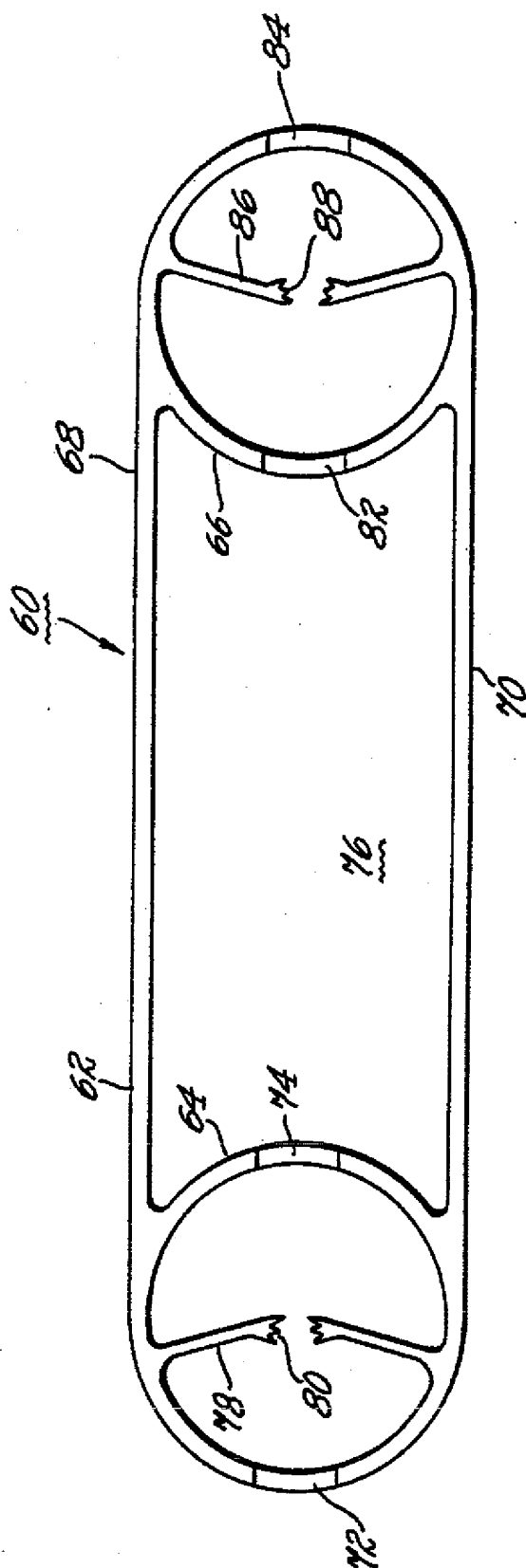
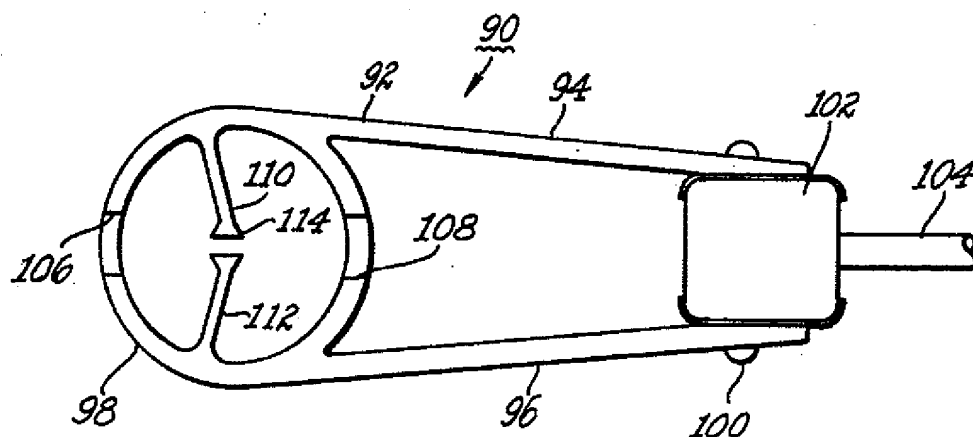
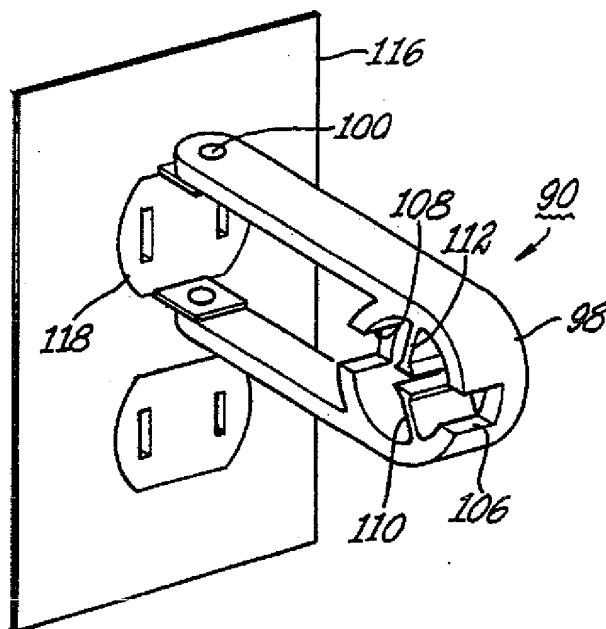


Fig. 2

**Fig. 3****Fig. 4**

ELECTRICAL CORD COUPLING

This is a continuation-in-part of application Ser. No. 07/815,750 filed Jan. 2, 1992.

BACKGROUND OF THE INVENTION

This invention relates generally to coupling means enabling the plug end of an electrical cord to retain locked engagement with mating electrical connection means and more particularly to a coupling device preventing accidental separation of the electrically connected cord plug during ordinary usage.

Various coupling means are already known whereby electrical cords provided with mating male and female plugs at one end can be held together during normal use. In one manner of coupling, there is disclosed in U.S. Pat. No. 4,917,625 an electrical connector device to be interposed between male and female plugs provided upon the ends of electrical cords. The connector includes springable arms having shoulders interengaging with shoulders formed on the adjacent ends of the plugs, in such fashion as to lockably engage the plugs and thereby prevent separation of the cords during use. Within the connector there is said to be provided electrical connector elements each having a female and a male end, adapted to mate with the electrical elements of the plugs, thus providing a thru electrical connection for the cords, while assuring that they will be held together against inadvertent separation. In another embodiment, the provision of electrical elements within the connecting device itself is omitted and instead, a yoke or retainer, usable in both embodiments has its spring arms against engaging shoulders on the plugs, with the plugs in this instance interengaging directly as well as being releasably, lockably engaged with the retainer. In a different manner of securing the connected plug ends from accidental separation during ordinary usage, there is disclosed in U.S. Pat. No. 4,917,626 coupling means holding the male and female plugs of a power tool and an extension Cord. A strap of interlocking "hook" material such as a Velcro heavy-duty hook type fastener, is said to be adhered to either side of the male plug, the straps extending longitudinally past the face of the plug approximately two inches. A pad of interlocking "loop" materials, such as a Velcro heavy-duty loop-type fastener is adhered to either side of the female plug so as to face the straps when the plugs are engaged, whereupon the straps may be pressed into interlocking engagement with the pads. The thus engaged two plugs are said to not to be easily pulled apart during usage yet are readily detached by a user when wishing to disconnect the engaged plugs. In a similar commercially available coupling means, metal hooks required to be secured by a user to both extension cord and power tool cord are engaged to prevent an accidental separation of the connected plug ends. It has now been found that a novel single-piece coupling device of unitary construction enables such user to more readily affix the connected electrical cords thereto in a manner less susceptible to accidental separation as well as provides a more versatile means to retain locked engagement for the plug end of a single electrical cord which has been connected by such user to other type mating electrical connection means such as service outlets and the like.

It is an object of the present invention, therefore, to provide improved coupling means retaining electrical

connection for the plug end of an electrical cord after having been connected to mating electrical connection means.

It is another object of the present invention to provide a novel single-piece coupling device having friction-fit retention means for at least one electrical cord.

A still further object of the present invention is to provide such coupling device with friction-fit retention means further exerting a restraining force against having an electrical cord being released therefrom.

Another object of the present invention is to provide a particular physical form of said novel single-piece coupling device suitable for attachment to the plug end of an electrical cord as well as various service outlets therefor.

Still another object of the present invention is to provide a novel single-piece coupling device with a plurality of retention means preventing physical separation between a pair of already connected electrical cords having mating male and female plug ends.

It is still another object of the present invention to provide a novel method preventing accidental disconnection of one or more electrical cords.

These and still further objects of the present invention will become apparent upon considering the following detailed description for the present invention.

SUMMARY OF THE INVENTION

A novel coupling device has now been discovered enabling the plug end of one or more electrical cords to retain locked engagement with mating electrical connection means. Generally, said coupling device comprises a single-piece body member molded with organic polymer having a pair of spaced-apart longitudinally extending arms, integral molded retention means joining said extending arms together at least at one end, cooperating rib means provided in said retention means which project inwardly from said extending arms and further include engaging shoulders for retention of the electrical cord by friction fit, and complementary opposed openings provided in said retention means to enable passage therethrough of the electrical cord. Such entire device can be formed with either flexible thermoplastic polymer materials or rigid thermoset type polymer materials employing conventional injection or extrusion molding practices. In one physical configuration, the retention means are provided at one end of the device with the opposite end having conventional fastening means suitable for device attachment to the plug end of a single electrical cord as well as various service outlets therefor such as a wall outlet. In a different physical configuration suitable to retain a pair of male and female plugs provided at the ends of a pair of electrical cords in locked engagement, retention means are provided at opposite ends of the device so as to secure the already interconnected electrical cords therebetween. In the latter type configuration, the coupling device can have a rectangular box-like form with openings being provided at both ends enabling the connected cords to be inserted for retention of the plug ends intermediate two pair of the cooperating rib means. The preferred rib means for both above type device configurations also project forwardly from the adjoining end of the body member so as to exert a restraining force against release of the electrical cord being held.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view depicting a representative coupling device of the present invention having multiple retention means being employed to retain a pair of connected electrical cords in locked engagement.

FIG. 2 is a top view for a similar type coupling device of the present invention prior to having a pair of connected electrical cords being physically secured thereto.

FIG. 3 is a top view for a coupling device of the present invention having single retention means in combination with fastening means enabling permanent joiner of said device to the plug end of an electrical cord.

FIG. 4 is a perspective view depicting the FIG. 3 coupling device being physically secured to a conventional service outlet for retention of an electrical cord connected to said outlet.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the accompanying drawings, there is depicted in FIG. 1 a perspective view for a representative coupling device of the present invention with a pair of already connected conventional electrical cords having been inserted therein by a user. Accordingly, the depicted assembly comprises a molded single-piece body member 10 formed with organic polymer so as to contain the connected electrical cords 12 and 14 in a manner preventing accidental separation during subsequent service. The illustrated electrical cords can be seen to have a male plug end 16 and a female plug end 18, respectively, so as to provide the means for physical and electrical interconnection prior to final attachment in the provided coupling device. Said device 10 has a rectangular box-like configuration 20 which includes bottom face 22, front end face 24, rear end face 26 and a pair of longer side faces 28 and 30 joining said end faces. End faces 24 and 26 have respective slot openings 32 and 34 enabling insertion of the electrical cords into the central cavity 36 provided in said device. Further retention means 38 and 40 are included in said central cavity intermediate its ends enabling a user (not shown) to simply secure the plug ends of the connected electrical cords therebetween by snap-in action. More particularly, said retention means each include semi-circular shaped shoulders 42 and 44, respectively, which engage the electrical cords when inserted therein and thereafter retain the inserted cords in place by friction fit. Retention means 38 comprises a pair of rib-like elements 46 and 48 projecting inwardly from the side faces of central cavity 36 and intersecting along the longitudinal center axis 50 of the coupling device. As can also be seen, the engaging shoulder portions 42 provided in said retention means has been optionally located at the point of intersection for the cooperating rib-like elements 46 and 48. It can be further noted in the present drawing that said retention means 38 projects forwardly from adjoining front end face 24 of the connector device thereby providing a means of strain relief to resist any mechanical forces being exerted along the center axis 50 of the coupling device and affixed electrical cords which tend to disengage the latter. In a corresponding manner, the remaining retention means 40 comprises rib-like elements 52 and 54 extending from the side faces and intersecting at engaging shoulder portions 44 while further projecting forwardly from adjoining rear end

face 26. This, a cooperative effort can take place with the illustrated retention means to provide a restraining force against having the affixed electrical plug ends being thereafter pulled apart during customary use. While such desired cooperation occurs in the illustrated embodiment when molded with either thermoplastic or thermoset type polymer materials, it is contemplated that generally greater flexibility ordinarily imparted with thermoplastic polymers can provide still further desirable spring back action.

Ability to form the above described Coupling device entirely by means of a single injection molding step affords still other significant advantages. Manufacturing costs can thereby be reduced since low-cost conventional polymer materials can be employed while parts assembly is avoided. Having the connected electrical cords enveloped by container means avoids physical and electrical damage occurring at the plug ends during usage with the sealed bottom further provided in said containment means reducing physical contact of the plug ends with any surface water or other deleterious liquids encountered during use. Utilization of the described coupling device also proceeds in a distinctive manner. A user simply connects the mating plug ends of the electrical cord together followed by inserting the interconnected cords into the end openings provided in the body member. To complete the clamping engagement between the interconnected cords and the coupling device only further requires a snap-in action by the user to further affix the cord in place with cooperating rib-like elements of the provided retention means.

FIG. 2 is a top view for a different molded coupling device of the present invention prior to having the engaged cords being physically secured thereto by a user. The depicted coupling device 60 can be produced from a single molded extrusion (not shown) with a cross section as illustrated upon severing individual body members from the extruded product in a customary manner. Accordingly, such individual coupling device 60 comprises a molded single-piece body member 62 again formed with organic polymer to have a rectangular box-like configuration but which is now devoid of either top and bottom faces. Body member 62 includes rounded front end face 64 and a similarly rounded rear end face 66 being joined together with longer side faces or arms 68 and 70. Front end face 64 is cylindrically shaped having a circular cross section provided with opposed openings 72 and 74 so as to enable passage therethrough of one electrical cord (not shown) into the central cavity region 76 of the body member. A first retention means is also physically disposed within cylindrical end face 64 to further enable attachment of the cord thereat by said user employing the friction fit provided with engaging shoulders 80. Correspondingly, rear end face 66 has a like cylindrical shape provided with opposed openings 82 and 84 for passage therethrough of the remaining electrical cord (not shown) so as to have the plug ends (not shown) of the connected cord pair reside in the central cavity 76 of the body member. A second retention means 86 is likewise disposed within said cylindrical end face 66 enabling user attachment of the remaining electrical cord thereat with the provided engaging shoulders 88. As can be seen in the present drawing, having the retention means 78 and 86 of the herein illustrated coupling device being aligned about the same as employed for the preceding embodiment provides a comparable restraining force

against having the affixed electrical plug ends from thereafter being pulled apart.

As hereinabove indicated, FIG. 3 is a top view for a different type coupling device of the present invention employing but single retention means to secure a locked engagement between an electrical cord and mating electrical connection means. The depicted device 90 again comprises a single-piece molded polymer body member 92 having a pair of spaced-apart longitudinally extending arms 94 and 96, integrally molded retention means 98 joining said extending arms together at one end, and conventional fastening means 100 disposed at the opposite end which attach both extending arms to the female plug end 102 of an electrical cord 104. Retention means 98 is again cylindrically shaped with opposed slot openings 106 and 108 being provided for passage therethrough of a mating electrical cord having a male plug end (not shown) to be connected to female plug end 102. Cooperating rib-like elements 110 and 112 are further included in said retention means with engaging shoulders 114 thereof enabling physical attachment of the mating electrical cord to the coupling device by friction fit. While not expressly shown in the present drawing, it can be appreciated that such physical attachment between the interconnected electrical cords is further enhanced in view of the particular retention means being employed to resist disengagement forces.

FIG. 4 depicts in perspective a further employment of the FIG. 3 coupling device 90 to retain a locked engagement when an electrical cord having a male plug end (not shown) is electrically connected to a conventional wall outlet fixture 116. Accordingly, coupling device 90 can be suitably affixed to said wall outlet fixture again with conventional fastening means 100 at a location adjacent one of the plug outlets for its subsequent utilization in the desired manner. A suitable mounting of said device astride the selected female plug outlet 118 with hinge-type fastening means 100 enables its displacement for subsequent insertion or removal of the male plug member. A user employing the herein described combination can first connect the male plug end of the cord into outlet 118 and thereafter secure the connected plug in place with retention means 98 of said coupling device. To secure the desired locking engagement simply requires inserting the now electrically connected cord into the opposed openings (106 and 108) provided with said retention means while further engaging the sides of said cord with cooperating rib elements (110 and 112). As can again be seen in the present drawing, said rib elements are physically oriented in the coupling device to exert a restraining force against having the engaged electrical cord being pulled away from the wall outlet.

It will be apparent from the foregoing description that significantly improved means have been provided to maintain continuous operation with various type electrical cords while in service. It will also be apparent that modifications can be made in the specific method and coupling means described for the illustrated embodiments without departing from the spirit and scope of the present invention. For example, modification of the retention means provided in the illustrated coupling device are contemplated such as by having the rib-like element pairs aligned perpendicular to the side faces of a body member and/or providing other structural means exerting a spring-back action in such retention means to resist forces tending to disengage an affixed electrical cord or cords. Accordingly, it is intended to

limit the present invention only by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A coupling device to retain locked engagement for the plug end of an electrical cord with mating electrical connection means comprising:

(a) a single-piece body member molded with organic polymer having a pair of spaced-apart longitudinally extending arms,

(b) integral molded retention means joining said extending arms together at least at one end,

(c) cooperating rib means provided in said retention means which project inwardly from said extending arms, said rib means having a pair of rib-like elements disposed proximate to but spaced-apart from said end of the molded body member while projecting forwardly therefrom at an acute angle from a longitudinal center axis of the body member, said rib-like elements including engaging shoulders for retention of the electrical cord by friction fit, and

(d) an end opening provided in said retention means and disposed rearward of said rib-like elements to enable passage therethrough of the electrical cord.

2. The device of claim 1 wherein the retention means is cylindrically shaped.

3. The device of claim 1 wherein the body member is formed with a rigid polymer.

4. The device of claim 1 wherein the body member is formed with a flexible polymer.

5. The device of claim 1 which further includes multiple pairs of cooperating rib-like elements which are aligned in opposite directions.

6. The device of claim 1 wherein fastening means are provided at the opposite end of the body member.

7. The device of claim 6 wherein the fastening means permanently secures the body member to the plug end of the electrical cord.

8. The device of claim 6 wherein the fastening means permanently secures the body member to mating electrical connection means.

9. The device of claim 1 wherein the body member includes retention means at both ends to retain a pair of connected male and female plugs provided at the ends of electrical cords.

10. The device of claim 9 wherein both retention means are cylindrically shaped.

11. A coupling device to retain a pair of male and female plugs provided at the ends of a pair of electrical cords engaged together comprising a single-piece open-ended container member molded with rigid organic polymer, the container member having a rectangular box-like configuration devoid of top and bottom faces but having a front end face and a rear end face joined together with longer side faces, both front end face and rear end face having a cylindrical shape provided with opposed openings enabling passage of the engaged cords into a central inner cavity of the container member disposed between the cylindrical end faces, and with a pair of spaced-apart integral molded retention means individually being disposed with the cylindrical end faces, the retention means each being provided with rib-like elements projecting inwardly from the side faces of the container member and further including engaging shoulders into which the engaged cords are individually held by friction fit, and with each of said rib-like elements being formed with intersecting side portions projecting forwardly from the adjoining end

face and having the engaging shoulders being located at the point of side intersection thereby providing a restraining force against having the engaged cords being pulled apart.

12. A method to retain locked engagement for an electrical cord having a plug end with mating electrical connection means which comprises:

- (a) connecting the plug end of said electrical cord to said mating electrical connection means, and
- (b) securing the mated electrical cord and electrical connection means together with a coupling device comprising a single-piece body member of molded organic polymer having a pair of spaced-apart longitudinally extending arms, integral molded retention means joining said extending arms together at least at one end, cooperating rib means provided in said retention means which project inwardly from said extending arms, said rib means having a pair of rib-like elements disposed proximate to but spaced-apart from said end of the molded body member and projecting forwardly therefrom at an acute angle from a longitudinal center axis of the body member, said rib-like elements including engaging shoulders for retention of the electrical cord by friction fit, and an end opening in said retention means disposed rearward of said rib-like elements to enable passage there-through of the electrical cord.

13. The method of claim 12 wherein the opposite end of said coupling device is permanently affixed to the plug end of said electrical cord.

14. The method of claim 12 wherein the opposite end of said coupling device is permanently affixed to the mating electrical connection means.

15. A method to retain locked engagement between a pair of electrical cords having mating male and female plugs at one end which comprises:

- (a) connecting the electrical cords together by engagement of the mating male and female plugs,
- (b) inserting the engaged electrical cords into a coupling device comprising a single-piece body member of molded organic polymer having a pair of longitudinally extending arms, integral molded retention means joining said extending arms together at opposite ends, cooperating rib means provided in both retention means which project inwardly from said extending arms, each of said rib means having a pair of rib-like elements disposed proximate to but spaced-apart from said ends of the molded body member and projecting forwardly therefrom at an acute angle from a longitudinal center axis of the body member, said rib-like elements including engaging shoulders for retention of the engaged electrical cords by friction fit, and opposed end openings being provided in each retention means enabling passage therethrough of said electrical cords, and
- (c) securing the engaged electrical cords in place by affixing both engaged cords to the provided retention means.

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EXHIBIT G

A model of a power cord plug securing device according to the present invention. This model was originally entered into the record by Applicant as a submission accompanying a responsive paper filed December 19, 2005.

X. RELATED PROCEEDINGS APPENDIX

None.